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BRITISH AND FOREIGN.

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

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THE

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Limonium Dubyi *O.Kuntze.*

THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN.

NOTES ON *LIMONIUM*.*

By C. E. Salmon, F.L.S.

VII.—Limonium Dubyi O. Kuntze.

(Plate 488.)

The first reference to this remarkably local plant appears to be in De Candolle's *Botanicon Gallicum*, i. 388 (1828), where Duby describes it as follows:—"*S. dichotoma* (Cav. Ic. i. p. 37 t. 50), foliis lanceolato-spathulatis mucronulatis petiolatis, scapis teretibus dichotomis ramosis ramis tuberculatis, floribus geminis secundis laxè spicatis spicis paniculatis, bracteis obtusis scariosis, perigonii externi dentibus subacutis. ♃ in arenosis maritimis agri Syrtici propè *la Teste* reperiit cl. Des Moulins."

The description applies fairly well, but the identification with *S. dichotoma* Cav.—an endemic Spanish species—was of course erroneous. Eighteen years later the plant was included in Laterrade's *Fl. Bordelaise*, ed. 4, 295, with practically the same diagnosis as that given by Duby.

Both Nyman (Conspec. Fl. Europ. 612, under *S. Dubyei*) and Boissier (in DC. Prodr. xii. 661, under *S. caspia*) mention a "*S. diffusa* Laterr. Fl. Bord. non Pourr.," but I have been unable to discover when this name appeared; ed. 2 of Laterrade's work is dated 1821, before the plant was discovered; ed. 4 I have already quoted; ed. 3 is not to be found in the libraries at South Kensington, Kew, or Linnean Society.

In 1850 our plant was properly described under *Statice* by Grenier and Godron (Fl. France, ii. 750), and named by them *S. Dubyei*. The description runs:—"Se distingue du précédent [*S. bellidifolia* Gouan] par sa panicule à rameaux très-allongés, *étalés-dressés et non divariqués*; par ses épillets plus gros, écartés les une des autres, distiques et *disposés en épis allongés, lâches, flexueux, non agglomérés au sommet des rameaux*; par sa bractée

* See Journ. Bot. 1903, 65; 1904, 361; 1905, 5, 54; 1907, 24, 428.

inférieure bien plus longue, une fois plus corte que l'interne, lancéolée, aiguë; par sa bractée interne *membraneuse seulement dans son tiers supérieur*, plus évidemment ridée sur le dos; par son calice plus grande, à lobes plus aigus; par ses scapes *décombants*, *diffus*, à rameaux bien plus allongés. Hab. Bayonne, la Teste, Vieux-Boncau."

The description seems a very good one for our plant, but in comparing a series of examples of *L. Dubyi* with those of *L. bellidifolium* I have failed to observe in the former the alleged distinguishing characters of wrinkled inner bract membranous only in its upper third and larger calyx.

Boissier (*l. c.*) has preferred to unite *L. Dubyi* with *L. bellidifolium* (in his herbarium it is labelled "*S. caspia* var. *Dubyei*"), but Nyman (Conspect. Fl. Europ. 612) kept both as distinct species. Most modern Floras adopt the latter plan, and it should certainly be followed by those who distinguish *L. humile* and *L. vulgare*; indeed, *L. Dubyi* differs from *L. bellidifolium* as regards the arrangement of spikelets upon the branches almost exactly in a corresponding manner.

Coste (Fl. France, iii. 161) considers that *L. Dubyi* is a species peculiar to the south-west of France. The *Index Kewensis* mentions Spain; but I have failed to find any notice of the plant in Spanish or Balearic Floras, nor have I seen any examples from these parts; the mistake was no doubt caused by the plant being originally misnamed *S. dichotoma*, a well-known Spanish species.

After examining a number of specimens of *L. Dubyi*, including those of Des Moulins, who originally discovered the plant, and sent it to Duby, and also examples collected by Grenier, its chief divergences from *L. bellidifolium* appear to be the elongated diffuse branches; the longer laxer spike with more separated spikelets; the acute outer bract, which is also longer in proportion to inner, and thus covers more of its herbaceous part.

Limonium Dubyi O. Kuntze Rev. Gen. Pl. ii. 395 (1891).

Statice dichotoma Duby in DC. Bot. Gall. i. 388 (1828); Mutel Fl. Fr. iii. 88 (1836), non tab.; Laterr. Fl. Bord. ed. 4, 295 (1846); non Cav. nec al.

S. Dubyei Godr. & Gren. Fl. Fr. ii. 750 (1850).

S. caspia Boiss. in DC. Prodr. xii. 660 (1848), pro parte (non aliorum).

Icon.—Coste Fl. Fr. iii. 161, f. 3035.

Exsicc.—Lange Pl. Europ. Aust. 1851–52, 197! Soc. Fl. Franco-Helvet. 1898, 887! Dörfler Herb. Norm. 4176! Billot, 446 (ex Nyman).

Planta *tota granulato-scabra*, glabra; squamæ rarissime foliaceæ; scapus ab imo ramosissimus; rami pauci inferiores steriles, multifidi, raro plurimi; folia *mox evanescentia*, fere modica, obovata vel lanceolato-obovata; *spicæ typice elongatæ laxifloræ*; *spiculæ contiguæ sed non imbricatæ*, interdum *longe separatæ*; bractea exterior $\frac{3}{4}$–1 l. longa *ovato-acuta, a basi hyalina*; *bractea interior exteriore sesquilongior*, late et usque ad superiorem tertiam partem hyalina; calyx $1\frac{7}{8}$–$2\frac{1}{8}$ l. longus, lobis albis nunquam

coloratis, *triangulari-acutis*, *nunquam rotundatis*, sæpe denticulatis-plicatis, dentibus intermediis nullis.

Plant 3–15 inches long, not hairy but scabrid-granular, particularly in upper parts. *Scape* rather stout, very much branched from near base, procumbent, rarely suberect. *Leaves* soon disappearing, 1–3-veined usually 1, ½–2 inches long, obovate or lanceolate-obovate acute or occasionally obtuse, mucronate or not, petiole about as long as blade. *Branches* diffuse, elongated, erecto-spreading, sometimes arcuate-reflexed, very few sterile (sometimes there are a great many sterile branches and only a few floriferous; this is usually in small examples). As a rule the angle of branching is not so wide as in *L. bellidifolium*, and the branches are more elongated. Sometimes the branches are irregularly flexuose, probably caused (as in *L. humile*) by tidal submergence. *Branchlets* subdivided. *Scales* triangular-acute, the larger ones with acuminate points, about 3 lines long at base of scape to ½ line at summit; very rarely foliaceous. *Spikes* rather long, sometimes 1–1½ inches, usually straight, typically lax-flowered. *Spikelets* 1–3-flowered, contiguous but not closely imbricate and usually laxly placed upon the rachis, occasionally so much so that there is the length of a spikelet between each, as in *L. humile*. *Outer bract* ¾–1 line long and almost as broad, ovate-acute, apiculate or not, wholly hyaline with faint veins at base. *Middle bract* 1–1¼ lines long, irregularly oblong-obovate, bifid or truncate, hyaline with veins. *Inner bract* 1½–1¾ lines long, oblong-obovate, broadly hyaline at sides and to upper third, about half as long again as outer bract. *Bracteoles* 1–2, 1–1¼ lines long, oblong-obovate or ovate, rounded or truncate, hyaline with 1 non-central vein. *Calyx* 1⅞–2⅛ lines long, irregularly hairy near base (rarely half-way up), particularly on veins, calyx-lobes triangular-acute, never rounded, white, never coloured, plicate, no intermediate teeth; veins of calyx not running beyond base of lobes. *Corolla* small, lilac.

Distribution.—South-west coast of France: Gironde! Landes! Basses-Pyrénées (*fide* Coste, &c.).

Description of Plate 488.

A. *Limonium Dubyi*, portion of plant, natural size.

B. Spikes from another specimen, natural size. 1. Outer bract of *L. bellidifolium*. 2. Ditto of *L. Dubyi*. 3, 4, 5, and 6. Middle bract, inner bract, bracteole, and calyx of *L. Dubyi*. All enlarged four times.

Both specimens from Cap Ferret, Gironde.

UGANDA *COMBRETACEÆ*.

By A. G. Bagshawe, M.B., F.L.S. and E. G. Baker, F.L.S.

The following is an enumeration of the *Combretaceæ* of the Uganda Protectorate, by which we mean the area so defined in the last edition of the *Colonial Office List*. It excludes a large tract of country which was included when Sir H. Johnston pub-

lished his *Uganda Protectorate*, and which now forms part of British East Africa. We have followed Engler & Diels Monograph of African *Combretaceæ* (1899) in the arrangement and sequence of species. The paper is largely based on collections made by one of us in 1903–7, now in the National Herbarium.

The genus *Illigera*, formerly included in the order, but now placed by Pax in *Hernandiaceæ*, has been recorded from the shores of the Victoria Nyanza.

Combretum.

Combretum umbricolum Engl. Pflanzenwelt Ost.-Afr. C. 280; Engl. & Diels, *l. c.* 23.

Mpanga River in Toro, alt. 3500 ft., *Bagshawe* 1059; "climber, calyx and corolla white." Mouth of Mzizi River, alt. 2200 ft., *Bagshawe* 1330; "flowers fragrant, tufts of brown hairs in vein-axils of lower surface of leaves."

Compared with the type (*Holst* 2965, from Usambara).

C. ferrugineum A. Rich. Tent. Fl. Abyss. i. 267.

Busoga, *Dawe* 92.

Leaves rather broader than in the type (*Schimper* 767, from Abyssinia). Engler & Diels place this and the next under *C. trichanthum* Fres.

C. Petitianum A. Rich. Tent. Fl. Abyss. i. 268.

Madi, *Speke & Grant.*

Also closely allied are a plant collected near mouth of Mizizi, *Bagshawe* 1323, alt. 2300 ft., and one from West Ankole, *Dawe*, alt. 5000 ft., in Herb. Kew.

C. splendens Engl. Pflanzenwelt, 289; Engler & Diels, *l. c.* 37.

Near Mulema, alt. 4500 ft., *Bagshawe* 290; Usoga, *Scott-Elliot* 7254.

[The plant collected by Mr. Dawe in Unyoro (926), and tentatively placed near *C. ulugurense* Engl. & Diels, requires further examination.]

C. (Ciliatopetalæ) **ankolense**, sp. nov. Frutex, ramis cortice griseo instructis, ramulis novellis fusco-tomentosis; foliis oppositis vel suboppositis, petiolo brevi fusco-tomentoso, lamina papyracea primo supra fusco-pilosa subtus dense lepidota demum nervis fusco-tomentosis, oblonga vel ovato-oblonga basi rotundata apice subacuminata, nervis lateralibus demum subtus conspicuis primariis 8–11 utrinque arcuatim adscendentibus, secundariis reticulatis; spicis pedunculatis axillaribus floribus tetrameris albis sessilibus; receptaculo superiore campaniformi intus piloso extus lepidoto inferiore subconico extus hirto, disco cupuliformi margine hispido; calycis segmentis latiuscule triangularibus; petalis minutis perspicue ciliatis latioribus quam longis apice emarginatis subobreniformibus marginibus involutis; staminibus styloque exsertis; fructu ignoto. Ad *C. splendentem* Engl. accedens, differt petalis latioribus, receptaculo superiore non extus hirto. Ab *C. microlepidoto* Engl. differt foliis subtus perspicue magis lepidotis.

"Near Mulema, South Ankole, alt. 4500 ft., *Bagshawe* 212; shrub with white flowers, in flower April 7th."

Folia 5–6·5 cm. longa, 2–2·5 lata. Foliorum petiolus 2–4 mm. longus. Spicæ sæpissime 2–4 cm. longæ. Receptaculum inferius 2 mm. longum; receptaculum superius 1·5 mm. longum. Petala ·8 mm. longa.

The distinguishing features of this plant are the shortly petioled leaves densely lepidote below, and the tetramerous white flowers with minute obreniform ciliate petals.

C. Welwitschii Engl. & Diels, *l. c.* 40.

Entebbe—Hoima Road, *Bagshawe* 808.

Bagshawe 184, from Kikobe Ferry, R. Kagera, may be allied, but is not in flower.

C. populifolium Engl. & Diels, *l. c.* 54.

Unyoro, *Dawe* 928; Busoga, *E. Brown* 287; Valley of River Kafu, *Bagshawe* 820.

The type comes from Djurland, *Schweinfurth* 1374.

C. elæagnifolium Planch. in Append. Speke Journ. Disc. Nile, 634.

Madi, *Speke & Grant* 734-5.

Engler & Diels place this species as a synonym of *C. collinum* Fres., and it is the *C. collinum* of Mr. C. H. Wright's Uganda List (*Uganda Protectorate*, pp. 329-351). It is very closely allied to the preceding.

[*C. reticulatum* Fres. and *C. glutinosum* Guill. & Perr. were recorded by Oliver (Trans. Linn. Soc. xxix. 71) from Madi (Grant), but the material is not satisfactory for certain determination.]

C. (Conniventes) **unyorense,** sp. nov. Frutex scandens, ramis adultis cortice cineriis glabris, ramis novellis tenuiter fusco-pubescentibus; foliorum petiolo sulcato fusco-pubescente mediocri, lamina obovata basi rotundata apice obtusa vel mucronata papyracea nervis lateralibus subtus prominulis 5–7 arcuatim adscendentibus secundariis primarios transverse conjungentibus foliis spicigeris decrescentibus; spicis fasciculatim axillaribus densifloris subglobosis paniculam amplam terminalem formantibus omnibus inflorescentiæ partibus ferrugineo vel fusco-pubescentibus; floribus subsessilibus; receptaculo extus fusco-pubescente inferiore elongato-fusiforme superiore campanulato-cylindrico intus præter discum omnino adnatum glabrum ferrugineo-piloso; calycis segmentis late triangularibus ± acuminatis; petalis sessilibus ovato-orbicularibus margine ciliatis basi cordatis; fructu 5-ptero ambitu suborbiculari basi truncato apice leviter emarginato alis quam corpore multo latioribus pedicellis brevibus. Species ad *C. abbreviatum* Engl. et *C. buvumense* Baker fil. valde accedens. Ab illo differt floribus pentameris, receptaculo superiore perspicue longiori, foliis latioribus; fructus pedicellis manifeste brevioribus. Ab hoc foliis spicigeris latioribus et apice non acuminatis. Ab *C. conferto* Laws. floribus minoribus, foliis minoribus et receptaculo extus fusco-pubescente.

Near Hoima, Unyoro, alt. 3500 ft., *Bagshawe* 1462. "A climber with scarlet flowers and cream-coloured silky fruits."

Frutex 7 m. attingens vel altior. Folia 5–7 cm. longa, 3–5 cm. lata; folia spicigera minora ± 2 cm. longa; foliorum petiolus ± 1·5 cm. longus. Receptaculum inferius ± 4 mm. longum; receptaculum superius ± 6 mm. longum. Petala ± 3 mm. longa, ± 2·5 mm. lata. Fructus 2·2–2·5 cm. long. et 2·5–3·0 cm. lat. Pedicelli fructiferi ± 3 mm. longi.

The distinguishing features of this plant are the almost glabrous adult leaves with a moderately long petiole and the dense axillary racemes of pentamerous flowers with scarlet ovate-orbicular sessile petals. The smaller leaves subtending the flowers are obtuse at the apex.

The following plants apparently differ from our type but are closely allied to it: River Mpanga, Kitakwenda, *Bagshawe* 1053, with flowers sometimes tetramerous, sometimes pentamerous, and longer fruit-stalks; *Bagshawe* 811, Singo, Valley of Kitumbwi.

Allied plants in Herb. Kew. are *Dawe* 463 (Toro), alt. 5000 ft., and 96 (banks of Nile, Busoga); (near Kampala) also *A. Whyte.*

C. BUVUMENSE Baker fil. in Journ. Linn. Soc. Bot. xxxvii. 152 (1905).

Island of Buvuma, Victoria Nyanza, *Bagshawe* 624.

C. CAPITULIFLORUM Fenzl ex Schweinfurth in Reliq. Kotschyanæ, 33; Engl. & Diels, *l. c.* 78, t. xxiv. fig. A.

Madi, *Speke & Grant* 717; Waki River, Unyoro, alt. 2200 ft., *Bagshawe* 1431.

The plants quoted agree well together; they differ from *Kotschy* 468, the type, in having a much less branched inflorescence.

C. RACEMOSUM Pal. Beauv. Fl. Owar. ii. 90, t. 118 (1818); Engl. & Diels, *l. c.* 82.

Lake Nyabukere, Toro, *Doggett*, alt. 5000 ft.; Semliki Forest, *Dawe* 644; valley of River Kitumbwi, *Bagshawe* 810; Toro, *Mrs. Tufnell.*

"Twiner, with red flowers; leaves below the inflorescence, *i. e.* all on the short flower-bearing branches are mauve. The leaf which subtends the flower-bearing branch is green or green speckled with white."

The Uganda material differs from type in having rather broader petals, and the leaves of the inflorescence tending to be blunter at apex.

C. CINEREOPETALUM Engl. & Diels, *l. c.* 84, t. xxiii. fig. E.

Entebbe, *Bagshawe* 756. A climber with red flowers. Fruit ± 2–2·3 cm. long and 1·8–2 cm. broad, purplish.

C. HISPIDUM Lawson in Oliver Flor. Trop. Afr. ii. 421; Engl. & Diels, *l. c.* 89.

Masinde, Unyoro, alt. 3000 ft., *Bagshawe* 874. East Toro, alt. 4500 ft., *Bagshawe* 1104; petals almost white on outer, pink

on inner surface. Entebbe, *Bagshawe* 786; scrambling shrub with reddish-pink petals; a plant with poorly developed inflorescence; has some tetramerous flowers.

C. ACULEATUM Vent. Choix de Plant, 58, in adnot.; Engl. & Diels, *l. c.* 93.

Nile Province, *Dawe* 931; near Gondokoro, *Sir S. Baker* 3.

TERMINALIA.

TERMINALIA MACROPTERA Guill. & Pers. Fl. Seneg. Tent. i. 276, t. 63; Engl. & Diels, *l. c.* 11, t. II. fig. A.

Acholi, *Dawe* 857.

T. DAWEI Rolfe in Journ. Linn. Soc. xxxvii. 516 (1906).

Acholi, *Dawe* 865. A small tree.

T. VELUTINA Rolfe, *l. c.*

Busoga, *E. Brown* 260, and Unyoro, *Dawe* 697; valley of River Kafu, *Bagshawe* 814.

T. SPEKEI Rolfe, *l. c.*

Madi, *Speke* 643; Acholi, *Dawe* 858.

T. BROWNII Fres. var. nov. ALBERTENSIS. Arbor ramis cinereis adultioribus glabris, ramulis apice dense foliatis; foliorum petiolo mediocri, lamina papyracea obovata vel oblongo-obovata, basi cuneata, nervis lateralibus subtus prominentibus; spicis axillaribus quam foliis sæpissime longioribus; floribus albis quam iis typi perspicue minoribus; staminibus minoribus; fructu ad basin longiuscule cuneato.

Semliki Valley, alt. 2300, *Bagshawe* 1291, in fr., Nov. 7th; mouth of Mizizi River on face of Lake Albert escarpment, 2300–3000 ft., *Bagshawe* 1319, in fl., Dec. 2nd; Semliki Valley, *Dawe* 634.

Arbor 10–12 m. alt. Folia adulta 8–10·5 cm. longa, 5–6·5 cm. lata. Receptaculum inferius 3·5–4 mm. longum, superius 1·5 mm. longum. Stamina 3 mm. longa. Stylus 3 mm. longus. Fructus 3·5–4 cm. longus, 2–2·5 cm. latus.

The fruits of this above variety are manifestly more cuneate at the base than those figured by Fresenius (Mus. Senck. i. 152), and the flowers distinctly smaller.

This tree yields "eseta," a powder which is burnt as incense in native churches. A branch of the size of a man's body is selected, and when a fungus is seen to grow on it the branch is drilled; the dust which comes out is the "eseta." It is sold in the native markets in the neighbourhood; it smoulders on ignition, burning with a fragrant smell.

ANOGEISSUS LEIOCARPUS Guill. & Perr. Tent. Fl. Seneg. i. 280, t. 65; Engl. & Diels, *l. c.* 31.

Bari, *Grant, Speke, & Dawe* 896.

HELLEBORINE Hill v. *EPIPACTIS* Adans.

By G. Claridge Druce, M.A., F.L.S.

In reviewing *The Dillenian Herbaria*, the Editor (Journ. Bot. p. 282, 1907) demurred to my use of the generic name *Helleborine* instead of the generally accepted *Epipactis*. I first suggested the name in Ann. Scott. Nat. Hist. 1905, p. 48, because during my work I became saturated with pre-Linnean names, and became convinced that Adanson's generic name *Epipactis* must give way to that of *Helleborine*, as established by Hill and understood by Ray, Tournefort, Haller (in his early writings), and other botanists, and as previously understood by Caspar Bauhin (*Pinax* 187, 1671). Both Ray and Tournefort lay stress on the nerved leaves and fibrous roots. In this conclusion the Editor now concurs, and it may be well to put on record the reasons which led to it.

In the preparation of the as yet unpublished "Flora of Buckinghamshire," my attention was naturally directed to John Hill, who lived at Denham in that county; and in going through his *Vegetable System*, his *Herbarium Britannicum*, and especially the *British Herbal*, I became struck with his general knowledge and ability at arriving at an independent judgement, and saw how unfairly he had been treated by his contemporaries and his immediate successors—few if any references to him are to be found in Hudson's *Flora Anglica*, Smith's *Flora Britannica*, *The English Flora*, or even in Withering's *Natural Arrangement*. Until quite recently his *Herbal* was considered to be pre-Linnean, and no more available for reference than Gerard's *Herbal* or Parkinson's *Theatrum*; even the *Index Kewensis* treats it in that sense; nor does Kuntze in his *Revisio* avail himself of its information. The general acceptance of the date 1753 for the starting-point of both generic and specific citation brought the work into more general recognition, although, like the works of Miller, it has received but slight attention in the excellent *Genera Siphonogamarum* by Dalla Torre. Messrs. Groves (*Manual of British Botany*, 1904) have revived the genera *Radicula* and *Cammarum*, the latter placed in the unsatisfactory list of *nomina rejicienda* of the Vienna Congress, and attach Hill's name to several genera until then wrongly attributed to more recent workers.

Hill naturally belonged to the school of Ray, and in many cases resented the unnecessary alterations in the names and conceptions of genera which Linnæus brought about. He showed his scientific insight in many cases by refusing to accept the views held by Linnæus, and often succeeded in proving those definitions to be erroneous. I may instance *Valerianella*, which Linnæus had merged with the distinct genus *Valeriana*; *Limonium*, which Linnæus had wrongly put in *Statice*; *Linaria*, included by Linnæus in *Antirrhinum*; and *Melilotus*, put with *Trifolium*. Hill also correctly separated *Mariana* from *Carduus*, *Centaurium* from *Gentiana*, *Glaucium* from *Papaver*, *Polygonatum* from *Convallaria*, *Radiola* from *Linum*, *Nymphoides* from *Menyanthes*, *Onobrychis*

from *Hedysarum*, *Fœniculum* from *Anethum*, *Petasites* from *Tussilago*, *Oxyria* from *Rumex*, *Damasonium* from *Alisma*, *Phyllitis* from *Asplenium*, *Meum* from *Athamanta*, *Alnus* from *Betula*, *Castanea* from *Fagus*, *Cirsium* from *Carduus*, *Oxycoccus* from *Vaccinium*, *Pneumaria* from *Pulmonaria*, *Cammarum* from *Helleborus*, *Radicula* from *Sisymbrium*, *Lens* from *Ervum*, and, as we shall see, *Helleborine* from *Serapias*.

In the *British Herbal*, p. 477, Hill thus defines *Helleborine*:—"The flower is placed upon the rudiment of the seed-vessel, without any cup, and is composed of five petals; and there is placed within a nectarium, of a oval form, hollowed at the base and divided at the top into three parts, the middle one of which is heart-fashioned. The leaves are broad and nervous, and the root is composed of interwoven fibres." It will be noticed that the last sentence definitely excludes the species of *Serapias*, described by Linnæus in the *Species Plantarum* as *S. Lingua*; it is practically taken from Ray and Tournefort's description of *Helleborine*. Hill goes on to say, "Linnæus places this among the *gynandria decandria*, the filaments being two and inserted in the pistil. He takes away the received name and calls it *serapias*." We have thus in Hill's description a proper definition of the genus as understood by Tournefort; the six species he describes consist only of *Helleborine* and the plants subsequently separated under the name *Cephalanthera* by Richard. Of the six species described by Hill, five are cited from Caspar Bauhin, and one (*Cephalanthera longifolia*) from Ray's *Historia*.*

It may be well to see what the genus *Epipactis* Adanson really is. In his *Famille des Plantes*, ii. 70, 1763,† he separates no new genus apart from *Serapias* as understood by Linnæus, but, on the contrary, adds vastly and most unscientifically to it. Adanson defines his genus *Epipactis* "Racines traçantes; feuilles grandes le long des tiges; fleurs panicule et épi; calice pendante, striée de nervures en dedans; capsule médiocre; graines plates, ailées." This description is quite indefinite compared with that of Hill. It may be urged that Adanson does not cite *Serapias* L. among the synonyms, but he does cite *Serapias* Diosk., and he does not include the genus *Serapias* among his six genera of Orchidaceæ—*Vanilla*, *Calceolus*, *Ophrys*, *Neottia*, *Orchis*, and *Satyrium*. His *Epipactis* is, indeed, rather a rubbish-heap than a properly formu-

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* The localities given under No. 6, "woods in our northern counties," cannot refer to *Cephalanthera rubra*, which is Bauhin's species, and he has probably confused it with *Helleborine atrorubens*. Hudson (*Flora Anglica*) fell into the same error. Hill follows Dillenius in referring "Helleborine latifolia flore albo clauso" to *C. grandiflora* S. F. Gray, and not to *C. ensifolia*, as I at one time thought; see Journ. Bot. 1907, p. 240.

† Adanson's genera are often inadequately diagnosed, but light is not infrequently thrown on their meaning by the synonyms given in the erratic "Table" or Index. In this instance ("Table," *l. c.*, ii. 554) he writes, "Epipactis Diosk. Mor. s. 12, t. 11, f. 15 [*Cypripedium*] Catesb. i. t. 58 [*Pogonia divaricata* Br.]. Elleborine Diosk. Tourn. t. 249. Mart. Cent. t. 50, Orchis, C. B. Prod. 29. Col. Ecp. t. 322, Serapias Diosk. Borion Diosk. Emboline Plin. Limodorum L. Aretusa L. *Elleborine* Gall." [*i. e.* the French name].

lated genus ; it certainly includes both *Serapias* and *Helleborine*, in addition to many other genera, and his synonymy shows that it covered *Cypripedium* and *Pogonia*.

It may, however, be contended that *Epipactis*, as established by Crantz, is available. This author (*Stirpes Austriacum*, fasc. vi. 456, 1769) writes "*Epipactis* Haller," giving also synonyms—"*Ophrys*, *Nidusavis*, *Helleborine* Tourn. aliorum: *Ophrys*, *Serapias*, *Neottia*, *Herminium* Linn." He continues: "Capsulæ antheriferæ duæ sibi vicinæ in glande articulata scapo staminifero et mobili." But this definition is useless to separate *Serapias* from *Helleborine*; indeed, as the synonyms quoted show, it is meant to cover both. The original *Epipactis* of Haller was founded on a single species, i. e. *Goodyera*, although it would appear that he subsequently lost grip of its characters, and added to that genus plants he formerly more correctly put in *Helleborine*; but, in any case, Haller's *Epipactis* is pre-Linnean. In fact, Crantz's genus *Epipactis* is scarcely less inchoate than that of Adanson, including as it does no fewer than eight genera. The publication, in 1805, by Willdenow, of his edition of the *Species Plantarum*, in which he followed Swartz (Act. Holm. 231, 1805) in using the name *Epipactis* to represent *Helleborine*, *Cephalanthera*, *Listera*, *Neottia*, &c., led Brown (Aiton Hort. Kew. v. 201, 1813), Gray (Nat. Arr. ii. 212, 1821), and Smith (*British Flora*, iv. p. 40, 1828) to adopt that name, which in Britain has been in general use since that time.

It being thus evident that Hill's genus *Helleborine* must supersede *Epipactis* Adans., the British species will stand as follows:—

H. LATIFOLIA Druce in Ann. Scott. Nat. Hist. 1905, 48, and Dill. Herb. 115 (1907) = *E. latifolia* All. Fl. Pedem. ii. 152 (1785).

Var. ATROVIRIDIS Druce *l.c.* = *E. atroviridis* W. R. Linton Fl. Derbysh. 270 cum ic. (1903),

H. MEDIA Druce *ll. c.* = *E. media* Fries Mant. ii. 54 (1839).

H. VIOLACEA Druce *ll. c.* = *E. violacea* Boreau Fl. Centre ii. 651 (1857).

H. ATRORUBENS Druce *ll. c.* = *E. atrorubens* J. A. Schultes Fl. Österr. ed. 2, i. 58 (1814).

H. LONGIFOLIA Rendle & Britten in Journ. Bot. 1907, 441 = *E. longifolia* R. & B. List of Seed-plants 29 (1907) (*E. palustris* Crantz Stirp. Austr. 462 (1769); *H. palustris* Schrank Fl. Monac. ii. 190 (1814). See Journ. Bot. 1907, 105, 441).

[While entirely in accordance with Mr. Druce in the adoption of *Helleborine* Hill (see Journ. Bot. 1907, 441) we are still of the opinion (expressed *op. cit.* 283) that Hill intended to restore the name as an equivalent of the Linnean genus *Serapias*, as indeed his words indicate. But his description, being confined to plants in the British Flora, excluded the plants to which *Serapias* is now restricted: and *Helleborine* thus applies to the British species, its limits being restricted later by the segregation of *Cephalanthera*. —ED. JOURN. BOT.]

CRITICAL STUDY OF *RANUNCULUS AQUATILIS* L. VAR. γ.

By Frederic N. Williams, F.L.S.

The Batrachian Ranunculi, grouped together as a section of *Ranunculus* by De Candolle in Syst. Nat. i. 233 (1818), were raised to the dignity of a genus by S. F. Gray in Nat. Arr. Brit. Pl. ii. 720 (1821), but were still further reduced in grade to a subsection of the section *Marsypadenium* by Prantl in Engler's *Jahrbuch*, ix. 266 (1887); which subordinate position, from the unsatisfactory nature of their defined specific characters, better befits the group.

Pending a much desired monograph of *Ranunculus*, the Batrachian group has attracted the critical attention of many botanists, whose opinions have varied as much as the deviations from the type in the more widely distributed species. Several of the so-called species (as defined) appear to merge into each other; and the differences which are alleged to separate one from the other are rather questions of degree than precise and definite characters. From the wide distribution of these plants in still waters, in running streams, in shallow pools, the deep margins of lakes, in muddy ponds, ditches, the wet mud of river-banks, in marginal reaches, and quarry holes, their extreme variability, especially in leaf-form, is remarkable. Of the characters attributed to the species and their subordinate forms, too much attention has been given to inconstant characters, of which some are variable, others valueless, and others deceptive; such especially as the tapering of the peduncle, the relative length of petals, stamens, and styles, the contiguity or otherwise of the petals, the number of stamens, the forms of the receptacle, achenes, and unfertilized pistils, and especially upon the presence or absence of floating leaves. In a group of plants so sensitive to the modifying influence due to the varying conditions of their immediate environment, especially in so far as it affects their vegetative organs, it is to the floral organs and especially perhaps to the external characters of the pistil that one has to look for the primary characters which distinguish species from one another, and at the same time serve to elucidate the natural affinities between the different members of the group which their reticular bond of union so effectually obscures. With the character of the pistils may also be associated that of the receptacle to which they are laterally attached, whether spherical or ovate-conical in form, and whether hispid, ciliate, or glabrous.

The multiformity of leaf-variation in *Hieracium*, and of prickle-and-gland variation in *Rubus*, has deeply complicated the study of forms under these two genera. Unless the inter-specific affinities are clearly marked off from intra-specific variation by characters more definite than those of leaf-modification, which are mainly if not entirely due to the chemical composition, temperature, depth, and movement of the water in which they grow, the study of the correlated forms of the water crowfoots will render the attempts to group them satisfactorily as nugatory and ineffectual as in the

case of the brambles and hawkweeds. Godron, in *Fl. de France*, i. p. 19 (1847), pointed out the characters derived from the structure of the receptacle and pistils for the discrimination and grouping of species; and the late Mr. O. Gelert, in a memoir in *Botanisk Tidsskrift*, xix. p. 7 (1894), indicated the structure of the stigma and the form of the papillæ as a constant character. The classical memoir on the Batrachian Ranunculi in this Journal (vol. ix. 1871), by Mr. W. P. Hiern, forms a comprehensive basis for all future work on the subject.

Following the method adopted by Mr. Hiern, it will be convenient here to give a chronological list of specific names which have been applied to a part or the whole of what is included by Linnæus in *Ranunculus aquatilis* var. γ—(1) as under *Ranunculus* and (2) under *Batrachium*.

Ranunculus.

1753. *R. aquatilis* var. γ L. Sp. Plant. 556.
1782. *R. fœniculaceus* Gilibert Fl. Lithuanica, iv. 261, n. 177.
1786. *R. trichophyllus* Chaix in Vill. Hist. Pl. Dauphiné, i. 335.
1789. *R. capillaris* Gaterau Pl. env. Montauban, 102—"var. dont toutes les feuilles sont capillaires."
1789. *R. divaricatus* Schrank Baiersche Flora, ii. 104, n. 859.
1792. *R. feniculaceus* Gilibert Exercitia Phytologica, i. 370.
1795. *R. flaccidus* Pers. in Usteri, Ann. d. Botanik, xiv. 39.
1799. *R. cæspitosus* Thuill. Fl. env. Paris, ed. 2, 279.
1799. *R. capillaceus* Thuill. Fl. env. Paris, ed. 2, 278.
1803. *R. pectinatus* Dubois Meth. Pl. env. Orleans, 454.
1804. *R. pumilus* Poiret Encycl. Meth. vi. 133.
1807. *R. abrotanifolius* Pers. Syn. Plant. ii. 106, in syn.
1834. *R. Bauhini* Tausch in Flora, xvii. II. 525.
1834. *R. paucistamineus* Tausch in Flora, xvii. II. 525.
1841. *R. affinis* F. Schultz in Flora, xxiv. II. 558.
1843. *R. minutus* Döll Rhein. Flora, 550.
1846. *R. confervoides* Fries Summa Veg. Scand. i. 139.
1847. *R. trichophyllus* Godr. in Gren. et Godr. Fl. de France, i. 23 (Nov.).
1847. *R. Drouetii* Godr. in Gren. et Godr. Fl. de France, i. 24 (Nov.).
1848. *R. Rionii* Lagg. in Flora, xxxi. I. 49 (Jan.).
1856. *R. sphærospermus* Boiss. et Blanche in Boiss. Diagn. Pl. nov. or. ser. II. v. 6.
1859. *R. lutulentus* Song. et Perr. in Not. Pl. Savoie, et in Billot Annot. Pl. France, 181 (1859).
1860. *R. micranthus* Brügg. in Zeitschr. Ferdinand. Tirol, III. ix. 7.
1869. *R. stenopetalus* Syme in Rep. Bot. Exch. Club, 1869, 7.
1871. *R. hydrocharis* formæ 22, 25, 27, 28, 29, 32, Hiern in Journ. Bot. pp. 100–103 (*cæspitosus*, *trichophyllus*, *Rionii*, *confervoides*, *Drouetii*, *sphærospermus*).
1876. *R. trichophylloides* Humnicki Cat. Pl. Luxeuil, dept. Haute-Saône, 7.

1879. *R. Sedunensis* Rion ex Wolf. in Bull. Soc. Murith. vii.–viii. 28.
1881. *R. capillus-naïdis* Touvet Ess. Pl. Dauphiné, 18.
1893. *R. dolichopodus* A. Kerner ap. Freyn in Zeitschr. Ferdinand. Tirol, 35 heft, 266.

BATRACHIUM.

1821. *B. pantothrix* S. F. Gray Nat. Arr. Brit. Pl. ii. 722.
1823. *B. capillaceum* Bercht. & Presl Rostl. ii. Ranuncul. 49.
1843. *B. eradicatum* Læstad. in Bot. Not. 1843, 114.
1845. *B. confervoides* Fries in Bot. Not. 1845, 121.
1850. *B. trichophyllum* Van den Bossche Prodr. fl. Bat. 7.
1852. *B. Drouetii* Nyman in Bot. Not. 1852, 98.
1859. *B. admixtum* Nyl. & Sællan Herb. Mus. Fennici, 35.
1865. *B. lutulentum* Nyman Syll. Pl. Eur. suppl. 29.
1866. *B. divaricatum* Schur Enum. Pl. Transsilv. 12; non Wimmer (1841).
1869. *B. flaccidum* Rupr. Fl. Caucasi, 15.
1877. *B. minimum* Schur in Verh. Naturf. Ver. Brünn, xv. II. 28.
1878. *B. cæspitosum* Nyman Consp. fl. Eur. 15; non S. F. Gray (1821).
1878. *B. pectinatum* Nyman Consp. fl. Eur. 15.
1878. *B. Rionii* Nyman Consp. fl. Eur. 15; non Nyman Syll. Pl. Eur. 174 (1854).
1889. *B. micranthum* Nyman Consp. fl. Eur. suppl. ii. 10 (sub n. 6).

There seems to be now no doubt that *R. aquatilis* L. var. γ, with due regard to the subsequent synonymy, comprehends two species, which in English floras are found under the names of *R. trichophyllus* and *R. Drouetii*. The object of the present paper is to ascertain what forms exactly are included in each of these species respectively, how each of the two species may be most satisfactorily circumscribed, what definite characters distinguish one set of forms from the other, and the salient features in regard to each in so far as they bear on habitat, geographical distribution, relative frequency, and the character of the water in which they grow. Much is to be learned from the examination of the land-forms, in which there is closer resemblance in habit and leaf-structure, while the floral characters remain distinct. So much confusion and obscurity have resulted from the involved synonymy, that, in order to preclude further doubt, the best way of distinguishing by names which admit of no uncertainty in their application the two sets of forms is to cite the former as *R. trichophyllus* Godron (1847) and the latter as *R. divaricatus* Schrank (1789).

Schrank's species is based on Tabernæmontanus's figure of "Fœniculum aquaticum tertium," which he characterizes as "ganz gut"; and which without doubt represents the plant mentioned in many English and French floras as "*R. Drouetii*," a fact which is also borne out by the description which accom-

panies this figure. It is only by a misconstruction of the word "tellerförmig," by which Schrank defines the form of the leaves, that has led the majority of French, German, and Russian botanists to apply the specific name of *divaricatus* to the plant known in all English floras as *R. circinatus* Sibth. (1794). Even Mr. G. C. Druce follows the continental lead in his *Fl. Berkshire*, p. 8, where he says:—"In adopting the specific name *divaricatus* [for Sibthorp's species], which was proposed for the plant in 1789, and which has been adopted by Ascherson (*Fl. Brandenburg*), Grenier and Godron (*Fl. de France*), Koch (*Syn. Fl. Germ.*), and many other botanists, the law of priority is followed though somewhat reluctantly. Sibthorp's name was the first binominal appellation given to the plant in Britain. . . . A few botanists have doubted whether Schrank's plant is identical with that of Sibthorp." Had the "many other botanists" verified the matter by turning to the pages of Tabernæmontanus, the correct opinion of the elect few would have been justified. The right application of *divaricatus* and *circinatus* to two distinct species being now demonstrated, a detailed analysis of the forty-four specific names in the above list will render clearer the disposition of the forms under *R. divaricatus* and *R. trichophyllus* respectively.

R. fœniculaceus Gilibert was revived by Rouy and Foucaud in *Fl. de France*, i. 70 (1893), to supersede the well-known *R. circinatus* Sibth., and they were followed by Halácsy in *Consp. fl. Græcæ*, i. 12 (1900), relying on Ledebour, *Fl. Rossica*, i. 28 (1842), who, disregarding priority, reduced *fœniculaceus* to a synonym of *divaricatus*, a name which he misapplied to a description of *R. circinatus*. The application of Gilibert's name to any one species of the Batrachian group is, however, uncertain and in no way justified. His bald diagnosis is limited to a few words in his *Fl. Lithuanica inchoata*, coll. iv. p. 261, n. 177 (1782). The brief description given is, "Habitus præcedentis, sed foliola capillacea, divergentia, breviora, et flos minor." The "præcedentis" referred to is named "*R. peucedanifolius*," but the description given is that of *R. fluitans*. Since this vague diagnosis will apply equally badly to *R. divaricatus*, *R. paucistamineus*, and *R. circinatus*, one is not justified in taking up the name to the exclusion of a later name of certain and definite application. For much the same reason it is not wise to take up the name of *R. trichophyllus* for any of the three plants last mentioned.

In the first volume of Villars's *Histoire des Plantes de Dauphiné*, among the lists of Chaix's "herborisations" occurs the cabalistically laconic entry, "*Ranunculus trichophyllus* (mihi) Hall. 1162," without a single word of discriminating characters. This by no means lucid reference may be expanded into *Historia stirpium indigenarum Helvetiæ*, ii. p. 69, n. 1162. Though Haller distinguishes a var. α and var. β, and gives many synonyms, Chaix does not in any way indicate the identity of the plant he refers to. Had Chaix referred definitely to Haller's earlier work, *Enumeratio methodica stirpium Helvetiæ indigenarum*, i. p. 328, n. 17 (1742), as Linnæus does under his *R. aquatilis*, where Haller

clearly indicates the plant which was subsequently described by Schrank under the name of *Ranunculus divaricatus*, there would have been no obscurity about Chaix's meaning. As it was, Chaix's name passed out of notice until it was revived by Grenier and Godron in the first volume of their *Fl. de France* (1848), where also unfortunately they misapplied Schrank's name of *R. divaricatus* to *R. circinatus* Sibth., two species founded on entirely different plants—an error for which Sibthorp himself was partly to blame, in giving as a synonym for his species *R. aquatilis* L. var. γ, where he obviously means var. β, as his reference to Plukenet's *Almagestum* shows. *R. aquatilis* L. var. γ is, without any doubt, *R. divaricatus* Schrank, as proved by Linnæus's citation from Haller's earlier work. There would, in fact, be more reason in keeping up *R. fœniculaceus* than there would be in arbitrarily defining the exact application of *R. trichophyllus* Chaix, which is no more than a *nomen nudum*. The former was at least recognized to the extent of being reduced to a variety as *R. aquatilis* var. *fœniculaceus* by K. F. Hagen in a memoir "De Ranunculis prussicis," printed by Ludwig in his *Delect. Opusc. Scient. Nat.* p. 488 (1790). I entirely agree with Freyn, in a paper "Zur Kenntniss einiger Arten der Gattung Ranunculus" in *Bot. Centralbl.* vi. 1881, beil. n. 26, p. 1, and with Blytt, in his *Haandb. Norges Flora*, p. 350 (1904), two most competent authorities in critical investigation, who, regarding *R. trichophyllus* Chaix as practically a *nomen nudum*, decline to recognize it as ranking for priority, and pass it over altogether. In a Batrachian *Ranunculus* precision and definition of characters are of more importance than the alleged priority of a vague and uncertain name. There appear to be very few copies of Gilibert's *Flora* in existence, and Mr. Britten kindly had the original description transcribed from the copy in the British Museum at Bloomsbury. *R. aquatilis* Weber in Wigg. *Prim. Holsat.* 42 (1780) includes vars. β and γ of Linnæus. Those who keep up the Linnean specific now apply it in its restricted sense to *R. peltatus* and its varieties. *R. capillaris* Gaterau is co-extensive with the whole of the Linnean *aquatilis* (α, β, γ, δ); *R. aquaticus* Lamk. *Fl. Franç.* iii. 184 excludes var. δ, and thus exactly circumscribes *R. aquatilis* W. Sp. Plant. ii. 1332 (1799).

R. divaricatus Schrank. As the *crux interpretum* on which the whole of the critical argument in this paper is based, I here transcribe Schrank's original description :—"Der Stengel schwimmend; die Blätter zusammengesetzet, tellerförmig; die Theile haarförmig, auseinanderstehend." In his later work, *Prim. Flor. Salisburg.* 145 (1792), this is rendered into Latin; "Caule natante; foliis compositis, orbiculatis; laciniis capillaribus, divergentibus." Then he adds in a note which may be thus translated: "Following Haller, I would separate these species of *Ranunculus*, rather than unite them as Linnæus has done, as science gains by the former."

R. flaccidus Pers. Mr. Hiern, in *Journ. Bot.* 1871, p. 102, has evidently not made this co-ordinate form sufficiently inclusive.

Under this name *R. divaricatus* was issued in *Herb. Fl. Rossicæ*, v. n. 203, "in stagnis secus fl. Mosqua prope Kuntzowo" (1889). Persoon says that, under the name of *Ranunculus aquatilis*, Leysser apparently includes two species, which ought to be separated; of these the more common one is *R. rigidus*, and with its rigid, close-set, dark-coloured leaves is quite different from *R. flaccidus*, which is bright green with loose-set leaves. Now Leysser, in *Fl. Halensis*, ed. 2, p. 136, n. 556 (1783), has *R. aquatilis* var. α, and var. β, of which var. α obviously = *R. circinatus*. Persoon defines his *R. flaccidus*, "foliis petiolatis omnibus incisis capillaceis, laciniis divaricatis flaccidis (in aquis stagnantibus)." This is somewhat vague, and may include more than *divaricatus* Schrank, as Leysser's var. β evidently corresponds with the var. γ of *aquatilis* L. The only other author who takes up the name is C. A. Meyer, Verz. Pflanz. doct. Kolenati in *Beitr. Pflanzenk. Russ. Reich*, lief. vi. 54 (1849). The description corresponds with that of *R. divaricatus* Schrank; and Meyer distinguishes the plant from *circinatus* (or, as he calls it, "*R. divaricatus* Koch") by the following characters: "Facile distinguitur foliis et illorum segmentis primariis petiolatis, laciniis undique divergentibus quidem, sed mollibus flaccidis et extra aquam collabentibus unilateralibus (non, ut in illo, rigidis divaricatis et circa caulem verticillatis)."

R. capillaceus Thuill. seems to include *divaricatus*, *trichophyllus*, a good deal of *circinatus*, and part of *fluitans*.

R. pectinatus Dubois is co-extensive with the last but somewhat more vague. It probably coincides with *R. pantothrix* Bertol. *Fl. Italica*, v. 577 (Jul. 1844—as stated "Finita est" on the fly-leaf at the end of the volume, not 1842 as incorrectly given on the title-page and copied by all authors); which is a name more restricted in its application than the original *R. pantothrix* Brotero (1804). This first edition of Dubois's *Flora* is a scarce book; there is not a copy of it at Herb. Mus. Brit. or at Herb. Kew. In the second edition (1833) the brief description is under n. 1030.

R. pumilus Poiret is the land- or mud-form of *R. divaricatus* or of *fluitans*; but of which it is somewhat doubtful. Mr. Hiern places it as a synonym of *cæspitosus*, the subterrestrial form of *divaricatus* (but without comment). Godron, in *Fl. de France*, i. 26, reduces it to *R. fluitans* var. *terrestris*. It was a plant growing on the margins of ponds at Fontainebleau, of which Bosc sent specimens to Poiret. The description certainly seems to fit the figure of a leafy stem of the latter in Cosson & St. Pierre's *Atl. fl. env. Paris*, ed. 2, t. ii. fig. 2 (1882). I do not know of any authentic specimens of Poiret's plant. The Latin diagnosis is "Ranunculus glaber, foliis pinnatis, pinnis petiolatis; foliolis minimis, linearibus; seminibus transve[rse] striatis, caule subnullo." In the fuller description (in French), he says that all the leaves are petiolate, they are radical, numerous, in small winged clusters, with three or five pinnules on capillary petioles, composed of short, very small leaflets; the carpels are few, spherical

or somewhat oblong, obtuse, and very glabrous, forming a very small head.

R. Bauhini Tausch. "Caule repente cespititio, foliis omnibus emersis petiolatis vaginantibus decompositis linearibus, carpellis minutis glabris in spicam oblongam dispositis." This is the plant figured in Jean Bauhin, *Hist. Plant.* iii. 781, f. 2 (1651); as may be noted, the wavy lines representing water are not seen in the woodcut, showing that it is the land-form that is represented, as Tausch also says "foliis *emersis*."

R. minutus Döll. Subsequently in the author's later *Fl. d. Baden*, p. 1337 (1862), he reduced it to *R. aquatilis* var. *succulentus* Koch, giving as a synonym *R. cæspitosus* Thuill. It therefore does not differ from the plants represented by the two previous names.

R. sphærospermus Boiss. et Blanche. Boissier says that it differs from *R. trichophyllus* and *R. Drouetii* in the short rigid leaf-segments, the very small petals, and the subglobose carpels.

R. stenopetalus Syme is an aggregate co-ordinate which includes also part of *diversifolius*.

Of the names under *Batrachium* little need be said. *B. pantothrix* S. F. Gray is used in a much more restricted sense than *R. pantothrix* Brotero, and corresponds almost exactly with the Linnean var. γ. He says that it is a mild herb "used for feeding cattle"; but I have not seen this strange use for the plant mentioned by any other author.

B. capillaceum Bercht. & Presl. The description is in Czech; so I cannot make anything out of it.

B. admixtum Nyl. & Saellan. "Affine B. confervoidi Fries. Folia longius petiolata anguste repetite 2–3-fida multo breviora linearia duploque latiora. Achenia glabra, spiculo laterali brevi." From the characters I do not see in what way this plant differs from *R. divaricatus* var. *eradicatus*, which is an earlier name (1842) than *confervoides* (1845). "Folia longius petiolata" is scarcely sufficient as a differential character. It occurred with *confervoides* in the Limingo district of Finnland.

The forms of the two species treated in the present paper include those which occur on the Eurasian Continent. So far as I can ascertain, *R. trichophyllus*, as here circumscribed, does not occur in any of its forms beyond the limits of Europe. On the other hand, *R. divaricatus* is a species of world-wide distribution and subject to greater variation within the limits of the species; which is found not only throughout temperate regions but at isotheral levels in Tropical Africa. In the list of forms of these two species given below, the forms that may occur in Africa, Australia, and the New World are not in any way dealt with, nor have I critically examined any specimens.

It was only on the publication of the first part of the first volume of Grenier & Godron's *Fl. de France* in November, 1847 (see note at the end of vol. i.), that the two species were definitely distinguished from one another. No previous botanist had properly defined the differential characters. "*R. paucistamineus*"

has been proposed for one or other of them, but Tausch's description (1834) is too vague: "Batrachium; caule abbreviato natante, foliis omnibus immersis petiolatis capillaceo-multifidis, floribus minimis sub-12-andris oligocarpis, carpellis hispidulis obtusis." Of the two it rather applies to *R. divaricatus*.

Segregatory grouping of the plants here comprised under *R. aquatilis* L. var. γ:—

I. R. DIVARICATUS Schrank (1789).
  Var. 1. COMMUNIS.
    lusus MACRANTHUS.
  Var. 2. ERADICATUS = *R. aquatilis* var. *eradicatus* Læstad. (1842).
    lusus MACRANTHUS.
    lusus FURCATUS.
  Var. 3. RIONII = *R. Rionii* Lagger (1848).
  Var. 4. ASCHERSONI = *R. Aschersoni* Freyn (1881).
  Var. 5. SPHÆROSPERMUS = *R. sphærospermus* Boiss. et Blanche (1856).
  Var. 6. CABOMBOIDES = *R. hydrocharis* var. *cabomboides* W. P. Hiern (1871).
  Var. 7. TERRESTER = *R. Drouetii* f. *terrestris* G. C. Druce (1897).

II. R. TRICHOPHYLLUS Godron (1847).
  Var. 1. COMMUNIS.
    forma TYPICA.
    forma FILICAULIS Rouy et Fouc. (1893).
    forma DOLICHOPODA = *R. dolichopodus* A. Kerner (1893).
    forma NUTANS.
    forma CARNOSA = *Batrachium confervoides* var. *carnosum* J. M. Norman (1893).
    forma NANA Beauverd (1904).
  Var. 2. TERRESTER Godron.
    forma CREBRIOR.
    forma GERMANICA.

I.—RANUNCULUS DIVARICATUS Schrank.

The history of this species from 1539 to 1739 is epitomized in the following list of names of the plant, verified by comparison of the text and figures in the authors cited:—

Sam Kreut, *Bock* (afterwards *Tragus*) Kreutterbuch, ii. ch. 43, p. xxxii (Strassburg, 1539), reprinted as Kreuter Buch (Strassburg, 1546).

Alga prima, *Tragus* (formerly *Bock*), Latin edition by D. Kyber, lib. ii. cap. 44, p. 687 (Strassburg, 1552).

Ranunculus chamæmeli foliis, *Gesner* Tab. Collect. 104 (Strassburg, 1553).

Millefolium aquaticum quoddam, *Gesner*, *l. c.* p. 90 b.

Ranunculus tertius, *Gesner* Hort. Germ. p. 275 (Köln, 1561).
Alga palustris et fluviatilis, *Gesner* Stirp. Collect. (Zürich, 1587).
Millefolium maratriphyllon tertium, flore et semine Ranunculi aquatici Hepaticæ facie, *Lobel* Icones, 791 (1581); *Johnson* (1633).
Ranunculus aquatilis alter, *Cesalpini* De Plantis, lxiv. c. 2 (1583).
Fœniculum aquaticum tertium, *Tabernæmontanus*, Kräuterbuch, p. 71 (1588); it is on the figure of this plant, which very clearly represents the water-fennel, that *R. divaricatus* is founded.
Millefolium aquaticum flore albo, *Clusius* Rar. Plant. Hist. (1601).
Ranunculus aquaticus fœniculaceus trichophyllus, *Fabio Colonna* Ecphrasis, t. ad p. 316 (1616); a most expressive name and the best and most characteristic figure of the plant in pre-Linnean works.
Millefolium aquaticum, foliis abrotani, ranunculi flore et capitulo, *Bauhin* Pinax, lib. iv. sect. 3, n. vi. p. 141 (1623).
Ranunculus aquaticus capillaceus, *Bauhin, l. c.* lib. v. sect. 3, n. vi. p. 180; *Morison* Plant. Hist. Univ. ii. p. 442, s. 4, t. 29, f. 32 (1680); *Tournefort* Instit. Herb. 291 (1700).
Ranunculus aquaticus omnino tenuifolius, *J. Bauhin* Hist. Plant. iii. p. 781, f. 2 (1651); *Ray* Hist. Plant. p. 586 (1686); Syn. Meth. Stirp. Brit. p. 249 (ed. 2, 1696).
Fine Water Crowfoot, *Petiver* Herb. Brit. Cat. t. 39, f. 2 (1713).
Ranunculus aquaticus albus fœniculi folio, *Barrelier* Pl. Hisp. Gall. Ital. Obs. Ic. p. 57, t. 566 (1714).
Ranunculoides fœniculo folio breviore, *Vaillant* in Bot. Paris, 1727, p. 170.

The earliest reference to our plant is that of Bock in 1539, where he says: "Im wasser findt man vilerley Sam Kreutter wachsen etlichs ist gantz zinnelecht mit wilen gewerblin, darumb würt es lang wie das Weggrass." In Kyber's Latin edition of 1552, which is a book nearly as rare as the German *editio princeps*, the plant is called "Alga prima," and is described in these words: "Primum genus nostræ Algæ, herba est geniculata et prælonga, Centumnodiæ vulgo vocatæ non absimilis, foliis admodum incisis. Hæc Junio mense elegantissimos, candidos, herbæ Fragariæ similes flores profert, quibus decedentibus capitula rotunda, echinata, instar Ranunculi succedunt. Herba est viridis, et quæ aquis fluentibus gaudeat." The character which suggests that the plant belongs here rather than to *R. fluitans* is "capitula rotunda, echinata," as in the latter species the fruiting-spike of pistils is rather oblong and glabrous; but the fine distinctions of modern species can scarcely be gauged with precision in the earliest descriptions not supplemented with a figure.

The description which follows was drawn up mainly from plants seen growing in the Lower Brent district of Middlesex, (between Greenford and Perivale, on a detached patch of alluvial nitc surrounded by the London clay, coloured yellow in the map prop imen and Dyer's *Fl. of Middlesex.* Several descriptions of

the species, and the examination of many plants from other localities, were also laid under contribution (all generic characters being eliminated).

Ranunculus divaricatus *Schrank* Baiersche Flora, ii. p. 104, n. 859 (1789); et Prim. Flor. Salisburg. p. 145, n. 527 (1792); *Mönch* Meth. Plant. p. 214 (1794); non *Koch* in *Sturm* Deutschl. Fl. heft 67 (1835), nec *Ledeb.* Fl. Rossica, i. p. 28 (1842), nec *Gren. et Godr.* Fl. de France, i. p. 25 (1847), nec plurium aliorum.

Aquatilis, ac simul omnino submersus (vel casu ad loca siccanea terrester), gracilis, perennis, 2–4 dcm. Caulis basi et ad nodos inferiores radicans, fibris radicalibus albis, fistulosus elongatus obtuse quadrangulus multum ramosus, hispidulus vel glaber. Folia læte viridia, omnia uniformia flaccida plus minus petiolata multifido-capillacea, repetite laxiuscule trifurcata, ambitu divergentia, internodium subæquantia vel eo paullum breviora; laciniæ divaricatæ in segmento sphæræ undique obvie patentes, haud in planum orbiculare dispositæ, partitionibus primariis subsequentibus subæquilongis vel parum longioribus, extra aquam plantâ ablatâ collabentes. Stipulæ parvæ latiusculæ petiolo $\frac{2}{3}$-adnatæ vaginantes membranaceæ breviter auriculatæ, sæpius glabræ vel solum superiores pilosæ. Alabastra primum ovata, modo ante anthesin oblonga. Pedunculi oppositifolii uniflori, foliis plus minus æquilongi vel paullum excedentes, florem versus haud attenuati, teretes striati, glabri vel hispiduli, $2\frac{1}{2}$–$3\frac{1}{2}$-vel 4 ctim.; fructiferi graciles longius incrementum capientes, crassitie receptaculi, basi recurvi superne subrecti. Flores 9 mm. in diam. et minores, stellati, proterandri. Sepala primum patentia demum reflexa, elliptica concava glabra, viridia sed maculis sæpe atro-violaceis picta, marginulo albentia. Petala alba, ungue flavo, oblongo-cuneata, non contigua, calycem vix superantia, basi foveâ flavâ nectariferâ rotundatâ nudâ instructa, angusta, in unguem inferne non contracta, striolata, venis approximatis 5–7; mox caduca. Stamina 5–10 (vel interdum 12), pistilla plerumque superantia. Spica fructifera globosa. Receptaculum valde hispidum, ovato-oblongum. Carpella in capitulum lateraliter alligata, 20–35 vel ad 45, interdum usque ad 60 vel etiam ad 85; turgida stylo deciduo terminata, pilis brevibus crassis griseis hispida vel sæpe quidem demum glabra, $1\frac{1}{3}$–$1\frac{1}{2}$ vel tantum 1 mm. longa, semi-obovata immarginata tenuiter carinata, apice rotundato-inflata, sed secus oram sublongiorem superiorem planiuscula, transverse corrugata et demum magis rugosa, rugis 7–9; stylus brevis exilis, fere ad extremitatem pistilli diametri longi insertus, hinc subcentralis, stigmate oblongo-ovato papillis albidis densis longis cylindricis instructo.

Hab.—World-wide in its distribution. The northern limit of the species is Berlevåg, in the amt of Finmarken, on the north coast of Norway, lat. 70° 50′ (*T. Fries*, ex J. M. Norman, *Norges Arktiske Flora*, ii. [1895] 33)—var. *eradicatus*. The southern limit of the species is in Tasmania along the Lake River, near Grindelwald and Formosa, in the county of Westmorland (*Gunn*, n. 1938, in Herb. Kew. coll. 1844), see also Hooker f. *Fl. Tasmaniæ*, i. 5 (29 Oct. 1855), and along the South Esk River and near Evan-

dale, in the county of Cornwall, lat. 42° (*C. Stuart* in herb. F. Mueller, et ex Bentham, *Fl. Australiensis*, i. 1863, p. 10)—var. *cabomboides*. I have not seen Fries's Norwegian specimens; the most northerly examples I have examined being those collected by Berggren (1870) at Claushavn, on the west coast of Greenland, lat. 69° 15′ (in Herb. Kew.), examples cited also by Lange, *Consp. Fl. Groenland*. p. 54 (1880). Fries's examples are referred to in *Botaniska Notis*. 1864, in a paper, "En botanisk resa i Finmarken 1864." In general floras the northern limit of the species is given as Iceland, from which island there are specimens in Herb. Kew. collected by C. C. Babington, near Reykjavik, in 1846—but this is some distance south of the Arctic Circle. This var. *eradicatus* is the "*Ranunculus aquatilis*" of Linnæus's *Fl. Lapponica*, but there is no specimen in Herb. Linn.

In one of the most recent local floras, MM. L. & M. Gortani, in *Fl. Friulana*, ii. 208 (Maggio 1906), give five varieties under *R. aquatilis*, of which three include vars. *trichophyllus*, *paucistamineus*, and *fœniculaceus*. The first is stated to be common in still and slow-moving water. The second occurs in slow-moving and muddy water. The last, which is obviously intended for *R. circinatus*, is found growing in water issuing from lakes. According to Grenier, *Fl. de la Chaine Jurassique*, 16 (1865), the present species grows in the ponds of the plain, but is not found in the mountains nor in the fir zone, where it is replaced by *R. trichophyllus*. See also Rapin, *Guide du Botaniste dans Vaud*, ed. 2, p. 12, n. 3 (1862).

Var. 1. COMMUNIS: ut supra.

Lusus MACRANTHUS.—Flores majores, 15 mm. in diam., petalis minus caducis. Pedunculi firmiores longiores, sub anthesi 2½–3 cm., post anthesin fructiferi usque ad 4–5 cm. Caulis magis angulatus.

Syn.—*R. trichophyllus* f. *Martini* Lamotte, Prodr. Fl. Plat. Centr. France, 43 (1877), not a species as given in *Ind. Kewensis*. Named by Lamotte after M. Martin, President of the Civil Tribunal of Romorantin, who studied the Batrachian Ranunculi and drew his attention to this large-flowered form.

Hab.—France: Saint-Loup in the Department of Loir-et-Cher (*E. Martin*); Riom, in deep ditches along the railway, and near Clermont-Ferrand, in the Department of Puy-de-Dôme (*Lamotte*); and Les Gazeriers, commune of Sussat, near Ebreuil, in Allier (*Lamotte*).

Var. 2. ERADICATUS.

Pusillus, 2–3 dcm., depauperatus. Folia 12–18 mm., confervoidea. Pedunculi 1½–2½ cm., filiformes. Alabastra non depressa. Flores 7–8 mm. in diam. Petala calyci æquilonga. Stamina 5–10. Carpella 20–25, in statu juniore hispida demum glabrescentia, primum olivino-atrescentia, demum brunnea; stylus reflexus.

Geogr. limits.—*W.*—Claushavn, on the west coast of Greenland, as stated above (*Berggren*).

N.—At Berlevåg, in the amt of Finmarken, Arctic Norway, as stated above (*T. Fries*).

E.—E. Siberia, on the Sajan Mountains (*E. Regel*, Pl. Raddeanæ i. p. 39, n. 50, 1861—"*R. aquatilis* var. *Sajanensis*").

S.—Russian Turkestan: Ala-Tau Mountains, north of Lake Issik-kul, in the province of Semirietshensk (ex *Hiern*, in Journ. Bot. 1871, p. 102)—lusus *furcatus*.

In the British Isles found only on Fingask Loch, Perthshire, and on Rescobie Loch and Balgavie Loch in Angus, flowering and fruiting under water two to five feet below the surface (see Journ. Bot. 1880, p. 344). Its reported occurrence near Dublin (*Corry* in Journ. Bot. 1882, p. 222) is very doubtful, both from the nature of the locality and from the fact that a careful observer like Mr. N. Colgan does not record its occurrence in his *Fl. of Dublin* (1904). In France it is found only in three departments: Basses-Alpes, on the Lake of Ligny near Annot (*Reverchon*); Alpes-Maritimes, in mountain-pools (*Reverchon*); Savoie, at the bottom of a pool in the forest of Aut-du-pré on Mt. Mirantin, in the commune of Conflans, on a cliff of talc-schist at 1000 metres above sea-level (*Billot*, exs. n. 2605, "*R. lutulentus*"). It is found also in Iceland (C. C. Babington, 1846, in Herb. Kew.), Swedish Lappland (the earliest record of this plant, by *Læstadius*, 1842), Finnland, W. Central Russia, in Germany only in the Hartz Mountains (*Hampe*), Austria, in the province of Tirol (*A. Kerner*, Sched. Fl. exs. Austr. Hung. n. 1706), also in Switzerland. The south limit in Europe is in the Alps of the Alpes-Maritimes (*Reverchon* ex Burnat, Fl. des Alpes-Maritimes).

Syn.—*R. aquatilis* var. *eradicatus* Læstad. (1842); *Batrachium eradicatum* Fries (1843); *B. confervoides* Fries (1845); *Ranunculus confervoides* Fries (1846); *R. paucistamineus* var. *borealis* Beurl. in Bot. Notiser, 1852, p. 156; *R. aquatilis* var. *Sajanensis* Regel (1861); *R. lutulentus* Song. et Perrier (1859); *B. admixtum* Nyl. et Saell. (1859); *R. trichophyllus* var. *demersus* N. E. Brown, in Engl. Bot. ed. 3, Suppl. 12 (1891).

The stipules are more adnate to the petiole (three-fourths of its length), thus more of the nature of a true sheath, and more usually quite glabrous, but not so in the Scottish plant, where they are pubescent. As compared also with the previous variety, the sepals are dark violet with a green median nerve. I can find no specific difference whatever in authentic specimens of *R. eradicatus*, *R. confervoides*, and *R. lutulentus*, not even in size. In Arctic Norway it is in flower from 7th July to 15th September, and after 13th August it may be found in fruit.

(To be continued.)

WATSON EXCHANGE CLUB REPORT, 1906–7.

[In accordance with our usual practice, we give some extracts from the most recent Report of the Watson Botanical Exchange Club. The Report contains a large number of notes on critical species, those on *Rubi*, by the Rev. W. M. Rogers, occupying

three pages, those on *Rosa*, by Major Wolley-Dod, eight, and those on *Hieracia*, by the Rev. E. F. Linton, five. For these and other critical matter reference should be made to the Report, which may be obtained from Mr. George Goode, Lyndhurst, De Freville Avenue, Cambridge. Mr. Spencer Bickham, the distributor for 1906–7, has succeeded the late Alexander Somerville as Treasurer of the Club.—Ed. Journ. Bot.]

Thalictrum flavum L. var. nigricans Jacq. In large masses in several spots near Llangorse Lake, Breconshire, v.-c. 42, July 26th, 1906.—The black coloration of foliage and stem was conspicuous even in the fresh plant, and has become more marked when dried. The fruits, as usual, are often distorted and swollen by insects, but when not so show the outline of this variety fairly distinctly.—Augustin Ley. A similar plant was named *T. gallicum* Rouy & Foucaud by Herr Freyn.—E. S. Marshall. I have known the plant under this name in the past, but cannot find out what *T. nigricans* Jacq. is. Rouy & Foucaud (Fl. de France) do not give it, though mentioning *T. nigricans* for two plants as "*non* Jacq." Herr Freyn named it *T. gallicum* Rouy & Foucaud for another Club, at the same time that I suggested *T. rufinerve* Lej. & Court. (*T. nigricans* auct. Gall. occid. *non* Jacq.); but *T. gallicum* is a plant very stoloniferous, with long stolons (Fl. de France, i. 29), and Herr Freyn did not have roots, whereas I know, from years of cultivation, that it is densely cespitose. It is very shy of producing seed of any sort in the garden. If Mr. Ley could get honest fruit it might help much towards a fresh determination. Meanwhile it fits Rouy & Foucaud's description of *T. rufinerve* fairly well.—E. F. Linton.—[The type of *T. nigricans* Jacq. is in the National Herbarium.—Ed. Journ. Bot.]

Fumaria Boræi Jord. var. serotina Cl. forma. Potato-field, Ponsanooth, Cornwall, v.-c. i. Sept. 21st, 1906. A very interesting form, on which Mr. Pugsley writes me as follows:—"A form of *F. Boræi* var. *serotina*, with sepals smaller than usual and globose fruits. I have seen similar plants from the Channel Isles and elsewhere, and it no doubt approaches *F. muralis*, and perhaps should be raised to separate varietal rank. In Guernsey it seems to keep constant, and I have had it under cultivation."—F. H. Davey.

Stellaria neglecta Weihe. South Croxton, Leicestershire, v.-c. 55, May 30th, 1906.—A. R. Horwood. This has the seeds acutely tubercled, and therefore is not the *S. neglecta* of Babington, which I have called *S. umbrosa* var. *decipiens*. By the law of priority, *S. umbrosa* Opiz must, apparently, rank as a variety of *S. neglecta* Weihe, and I believe that this Croxton plant is type *neglecta*. Var. *decipiens*, which is certainly worth distinguishing, has bluntly tubercled seeds, in that respect coming nearer to *S. media* Vill. It should be called *S. neglecta* Weihe var. *decipiens* mihi.—E. S. Marshall. Tubercles acute; pedicels and calyx hairy; pedicels longer than *flowering*-calyx. I quite think true *umbrosa*—habit, &c., right. I am no nomenclaturist, so do not

pretend to say the correct name it should bear. Mr. Marshall says that this is, he believes, type *neglecta*. How is that distinguished from *umbrosa*?—C. E. S. We have in Britain three distinct forms:—

1. *S. neglecta* Weihe. Pedicels and calyx hairy; seeds acutely tubercled.

2. *S. umbrosa* Opiz (*S. Elisabethæ* F. Schultz, apparently). Like the above, but with *quite glabrous* pedicels and calyx.

3. *S. neglecta* var. *decipiens*. Like *neglecta* but for the *bluntly* tubercled seeds. Habit usually rather different—nearer *S. media*.

I consider *S. umbrosa* (our usual form, at least in the West, and by far the most markedly different from *S. media*) the true "type" of the species; but one has to accept the Vienna rulings, so our arrangement must be:—

S. neglecta Weihe.

b. Var. *umbrosa* (Opiz).

c. Var. *decipiens* mihi = *S. neglecta* auct. angl. (non Weihe).

—E. S. Marshall.

Rubus mutabilis Genev. var., *fide* Dr. Focke. Roadside waste in Thakeham parish, at the back of the South Downs, West Sussex, v.-c. 13, July 26th, 1902. Known to me during the last fifteen years as occurring in abundance over a considerable area. Type *mutabilis* is stated by Mr. Rogers to be very imperfectly known in Britain. I have taken the Devon plant for comparison, and find that my West Sussex gathering differs as follows:—Stem less hairy, but much more glandular, with a dense armature of tubercular-based prickles and strong uneven aciculi. Leaflets paler, smooth above, not rugose, less hairy, and with close grey felt beneath; margin truly dentate, with simple, shallow, and nearly regular teeth; terminal leaflet obovate-elliptical cuspidate, differing widely in outline from the cordate-ovate-acuminate leaflet of var. *nemorosus*. Sepals less strongly reflexed. The colour and texture of the foliage, with the marked characteristics of outline and margin, strike me as specially noteworthy. In some respects the plant approaches *R. rudis*. If at any time it may be thought admissible to apply a distinctive name, I would suggest that of var. *Naldretti*, after an old Sussex family.—Jas. W. White. Certainly very distinct from the Devon var. *nemorosus*, and especially, as Mr. White points out, in the foliage and the paler colouring. The panicle also seems still more pyramidal in outline, in spite of its truncate top, while its prickles are far slenderer and more crowded. Thus while in the shape of the leaflets, though not in their toothing, hardly distinguishable from the Surrey *R. mutabilis* (which may stand for our type), in panicle it is farther away from that than var. *nemorosus* is, and so may well claim varietal rank. Mr. White's Rudgwick plant (July 19th, 1893) is, as he has pointed out, obviously different, and may, I think, go under the type.—W. M. Rogers.

Artemisia Stelleriana Besser. Marazion Beach, West Cornwall, v.-c. 1, Sept. 15th, 1906. This handsome species occurs in comparative plenty on the sandy beach, where it flourishes in

company with *Eryngium maritimum* L. and *Cakile maritima* Scop. It was first recorded for that locality by the late Mr. W. A. Glasson in the Trans. Penzance Nat. Hist. and Ant. Soc. for 1888. Lady Smyth recently told Mr. Clement Reid that she has known the plant there for fully thirty years. Although there were scores of flowering branches in good condition in September, I could see that there had been a still greater number about two months earlier. There is no garden near, and nothing to point to the origin of this Kamschatkan species in such an unexpected locality. For further valuable information about this plant in Britain, see Journ. Bot. 1894, pp. 70–75, and 1895, p. 316; also Colgan's *Flora of County Dublin*, p. 110.—F. H. Davey.

Myosotis arvensis Lam. var. umbrosa Bab. Under shaded hedgerows, South Croxton, Leicestershire, v.-c. 55, May 30th, 1906. The flowers were as conspicuous as those of *M. sylvatica*, to which it bears a homœomorphic resemblance until examined more closely, but in the process of drying they quickly lose their character. The variety seems to be a much taller, more hirsute, and more robust form of the type, the general facies being quite distinct, apart from the emphasized difference in the flowers.—A. R. Horwood. In March, 1889, Prof. Babington wrote to me as follows:—"I have struck the word *umbrosa* out, and am sorry to find it in the Lond. Cat. I believe it to be only a shade-plant with broader leaves and larger flowers, but undeserving of special notice." It is expunged from Bab. Man. ed. ix.—E. S. Marshall.

Cuscuta europæa L. (1) Clover-field, Hauxton, Cambridgeshire, v.-c. 29, September, 1906.—E. J. Allard. Seems to me correct.—S. H. B. I should call this plant *C. Trifolii* Bab.—E. F. Linton. I have never seen *C. europæa growing on clover or in cultivated fields*; it occurs on very many species by roadsides, especially by streams on nettles, *Calystegia*, &c.—A. Bennett. Fringed scales present in my specimens, but very hard to see in *old* flowers. I, too, have never seen this species on clover.—C. E. S. (2) Hedgerow and field, Comberton, Cambridgeshire, August, 1906.—E. J. Allard. I think correct.—S. H. B. I am inclined to agree to this being *C. europæa*.—E. F. Linton. Both these plants seem to me not to be the true *europæa*, but the var. *nefrens* Fries, Herb. Normale, xi. 17. I am not sure of my premisses, but I have failed to find the scales with corolla; if present, they are so assimilated with the corolla in drying that I have failed to see them; when fresh, in the ordinary form, they are easily seen. If the scales are absent or nearly obsolete, then it is Fries' plant. This form has been found in England (Thirsk, Yorkshire, and Twycross, Leicestershire); *cf.* Syme, Eng. Bot. vi. (1866), p. 90, but he considers it not native.—A. Bennett. Lange (Haand. i den danske Flora, ed. iv. p. 483) says of the variety:—Form *β*, which, according to Fries, is found on *Vicia sativa*, is perhaps a distinct species, which deserves further investigation." He identifies it (with a query) with *C. Schkuhriana* Pfeiffer (Bot. Zeit. 1846, p. 20). I do not know the var.—E. S. Marshall.

CHENOPODIUM ALBUM L. (1) var. *incanum* Moq.; (2) var. *viride* Syme; (3) intermediate between (1) and (2). New Humberstone, Leicestershire, v.-c. 55, Aug. 16th, 1906. The plants sent appear to be as typical of Syme's variety as any seen, but growing with these were other varieties and forms of intermediate character, of which some specimens are sent for comparison. The var. *paganum* also grew in the same station, and *C. ficifolium*. Altogether thousands of plants might have been counted, many merging from one variety into another.—A. R. HORWOOD. I think these three specimens are rightly distinguished.—E. F. LINTON. Being only varieties of one species they would notably merge into each other. I believe this can be seen wherever the species grows on rubbish, uncultivated ground, &c., but in cultivated ground the var. *incanum* prevails mostly.—A. BENNETT.

JUNCUS TENUIS Willd. (1) Derry Island, near Seggieden, East Perthshire, v.-c. 89, Aug. 10th and Sept. 27th, 1903; July 5th, 1904. For particulars of the discovery and habitat of this plant see Annals Scottish Nat. Hist. 1904, p. 59. The plant still maintains itself in this station as plentifully as in 1903, though it does not seem to spread much.—W. BARCLAY. (2) Waste ground near Belfast Harbour, Co. Down, September, 1905, and October, 1906.—C. H. WADDELL.

NOTICES OF BOOKS.

The Flora of West Lancashire. By J. A. WHELDON, F.L.S., and ALBERT WILSON, F.L.S. Illustrated with coloured map and fifteen reproductions from photographs of some of the most interesting and characteristic scenery. To be obtained from the Authors, 60 Hornby Road, Watton, Liverpool. 8vo, cl., pp. 511. Price 12*s.* 6*d.*

ALTHOUGH the authors in their preface modestly claim to have "followed the conventional models in the plan of their Flora," those who open the book will not fail to detect features which, if not precisely new, have assumed a position and importance unusual in works of the kind, and the absence of others to which they are accustomed. There is, for example, an almost entire absence of the biographical matter which in some recent floras has assumed undue proportions; the list of authorities quoted, including bibliography, occupies barely five pages. The authors have throughout restricted themselves to matters strictly connected with the district they have undertaken to examine, so that there will be no need to search their pages for "new combinations" or for notes upon critical species which are more accessible in a magazine than in a local flora. The distribution through the eight districts into which the area—"vice-county 60 of Watson's *Topographical Botany*—the portion of Lancashire north of the Ribble and south of Morecambe Bay"—is divided has been carefully studied and is sufficiently indicated, though the number of localities given is comparatively few.

The most striking feature of the book however is the introduction, which extends to more than a hundred pages, and embraces a very careful study of the history, past and present, of the various districts and of the changes which have been brought about by the encroachments of building, drainage, and other results of civilization. The characteristic botanical and other features of each district are thoroughly worked out. Even more interesting are the chapters devoted to plant distribution as affected by altitude and by rocks and soils. The authors tell us in their preface that "the idea of including what is known as a 'botanical survey,' on lines recently much advocated, was considered and abandoned" partly on account of the delay which such a survey would occasion and partly because of the necessity of keeping the size of the book within due limits. "The elementary facts," they continue, "are here marshalled and arranged, and it is hoped they will be of assistance in furthering any future research into the problem of plant ecology that may be undertaken in West Lancashire." To our mind this statement greatly underestimates what has been done. No doubt the ecological side of the work is capable of further development, but it will be a great advance on what has previously been done in this direction in local floras if Messrs. Wheldon and Wilson's book be studied by future compilers of such works and taken as a model for investigation and record. A word must be said in praise of the singularly excellent illustrations of scenery bearing on this portion of the Flora, reproduced from photographs by Mr. Wilson, the only drawback to which is the weight that the paper necessary for the purpose gives to the book, which is too heavy to be carried about with comfort. These aspects of vegetation, for such they mostly are, are admirably selected and very instructive; where all are so good, it is difficult to select any for special praise, but the "Navel Pot, Leck Fell," "showing hanging vegetation on vertical limestone sides"—*Actæa* grows in this pot-hole on inaccessible rock-ledges, and, with the exception of a neighbouring locality, does not occur elsewhere in Lancashire—and the "limestone pavement, Gatebarrow Wood," with yew and ash, are especially effective.

We are glad to see that the local names are recorded, but wish that the authors had had the courage to abandon the made-up ones which are considered necessary for flowering plants, although no one would think of employing them for mosses. It is impossible to suppose that anyone ever actually spoke of *Scirpus cæspitosus* as the "Scaly-stemmed Spike-rush" or called *Carex extensa* "Long-bracteated Sedge"; and the printing of such titles occupies space which might be more usefully employed.

We must not omit to add that the mosses, hepatics, and lichens are fully catalogued, and that the book is carefully and clearly printed. The authors are to be congratulated on an excellent piece of work, which may take rank with the best of our county floras.

Trees and their Life Histories. By Percy Groom, M.A., D.Sc., &c. Illustrated from photographs by Henry Irving. 4to, cl., pp. xvi. 407. Price 25*s.* net. Cassell & Co. [No date.]

Printer, publisher, and author have combined to make this a handsome and attractive volume. But it must be said at the outset that those who buy it expecting to find a collection of good illustrations with the usual chatty gossiping more or less accurate account of trees and their literary and historical associations will be disappointed in the latter, though not in the former anticipation. Dr. Groom's aim is "rather to guide the interested observer of Nature than to attract the book-lover"; he has provided for the folk who really observe and want to know, rather than for those who gush about Nature but do not care to study it, and by so doing he has conferred a benefit upon a class too little provided for, standing as they do between the mere dilettante, for whom Mr. F. E. Hulme and other writers are recognized purveyors, and the scientific student, for whom the late Prof. Marshall Ward made ample provision. Dr. Groom's treatment of his subject is indeed scientific, but it presents no difficulties which those who want to know will find serious; and the admirable illustrations—more than five hundred in number—render the book thoroughly attractive.

The work is prefaced by an introduction of forty pages, dealing with the various parts of a tree and their growth and development, the remainder being occupied with very full and careful descriptions of about seventy of the trees best known in this country, whether as natives or in cultivation.

Although there is no attempt to treat the subject in a popular style, Dr. Groom has avoided unnecessary technicalities; we think, however, that a short glossary would be a useful addition to the book, and we regret the almost entire omission of any information as to geographical distribution—we are not even told which are native and which introduced. This, however, the author may say is no part of the "life-history." The selection is excellent and representative, although we think the Chestnut should have found a place.

As we have already said, the book owes much of its attractiveness to the very numerous and admirable illustrations, all of them from photographs by Mr. Henry Irving. Some of these—notably the full-page illustrations of individual trees, often at different seasons of the year—are very beautiful; those of the trunks lend themselves specially well to this method of reproduction. Here and there we notice one which is not quite characteristic—*e. g.* the Cypress (fig. 163)—and the figures of young beeches (figs. 2, 3) are somewhat difficult to disentangle from their surroundings; but as a whole they are excellent, and sometimes—*e. g.* the "wind-clipped oaks" (fig. 20)—represent states not often depicted. The only drawback to these illustrations is the paper which they necessitate: the book weighs 4 lb. 11 oz. but this is not a serious drawback, as it will not have to be carried about. The index

might be fuller—the oaks just-named do not appear in it. We regret to observe that the publishers still persist in their unscholarly practice of omitting the date from the title-page, nor does the preface supply it, as sometimes happens. It may be added that Mr. Irving's photographs, on a somewhat larger scale than the limits of a quarto page will allow, form an attractive feature of the cases illustrating British trees in the hall of the Natural History Museum.

La Flore de la Suisse et ses Origines. Par H. CHRIST. Edition Française traduite par E. TIÈCHE; revue par l'auteur. Nouvelle édition augmentée d'un aperçu des récents travaux géobotaniques. Bale: Georg & Cie. 8vo, cl. pp. xvi, 572, 117. Price 16 francs.

THOSE who expect to find in this volume a new edition of that published in 1883, as the title-page might seem to imply, will be disappointed. The book is a re-issue, with the addition of a Supplement containing a summary of the observations that have been made by the author and others during the last twenty-five years. These relate sometimes to geographical matters, sometimes to the prehistoric flora, sometimes to individual plants (such as the Chestnut) or to groups (such as the Alchemillas); there is also an interesting summary of the additions made during recent years to the Swiss flora.

The work itself is so well known, and its merits are so generally recognized, that there is no need to pass it in review. The central position of Switzerland enables the author to trace the representation within its limits of elements representing the floras of eastern and southern Europe, to suggest how these, as well as the indigenous species, have given rise to new endemic forms; and he traces the influence, direct and indirect, of cultivation upon the vegetation of Switzerland. Dr. Christ has the advantage, not always found among generalizers, of an intimate and critical acquaintance with the plants of the country, and this gives a value to his work which would otherwise be lacking.

The concluding paragraph of the author's preface to the Supplement, written as it is from a standpoint somewhat unusual in recent literature, may be worth quoting:—"En terminant, je me sens poussé à rendre le témoignage énergique que, plus j'avance en âge et plus les merveilles de Dieu se dévoilent devant mes yeux, plus aussi je me livre sans réserve à ses saints étonnements qui sont la jouissance la plus élevée que l'homme puisse éprouver en présence de l'œuvre du Créateur sur cette terre. Pour moi, ce n'est pas la lutte brutale pour l'existence, c'est au contraire l'aide mutuelle, la symbiose harmonique des êtres qui domine, et qui est une des révélations les plus manifestes de la grandeur de Dieu."

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on 5th December, Dr. Stapf exhibited a series of specimens of *Spartina Townsendi* representing different stages of development and tall and dwarf forms, and for comparison also typical specimens of. *S alterniflora*, *S. stricta*, and on behalf of Messrs. H. & J. Groves, *S. Neyrautii* from the estuary of the Bidassao River. The specimens of *S. Townsendi* and *S. stricta* were collected by the exhibitor in the Isle of Wight; those of *S. alterniflora* near Millbrook Station in Southampton Water. He pointed out the morphological differences of the three English species, which show *S. Townsendi* to hold in many respects an intermediate position between *S. alterniflora* and *S. stricta*, although it is different enough to be treated as specifically distinct from either. He then described the distribution of the three species, and more particularly that of *S. Townsendi*, which was first collected near Hythe in 1870 and distributed as *S. alterniflora*. Three years later the brothers Groves found it again in the same locality, and in 1881 they recognized it as a distinct new species and named it *S. Townsendi*. At present it covers many hundreds or, may be, thousands of acres on the muddy foreshores of the Hampshire coast and the Isle of Wight, threatening *S. stricta* with extermination in some places. There are three theories to explain the appearance of the grass, which is too conspicuous to have been long overlooked:—(1) It may have been introduced, like *S. alterniflora*, which is a common mud-grass on the Atlantic coast of America from Newfoundland to Brazil; Lord Montagu has, in fact, stated that the people on the shores of Southampton Water have a notion that it was introduced by an Argentine ship. But, so far, no *Spartina* corresponding to *S. Townsendi* has been found in America, and the Argentine species, mentioned by Arechavaleta and Stuckert, are distinctly different. (2) It may have originally arisen as a mutation of *S. stricta*, and, the characters having become fixed, the progeny now behaves like an ordinary species. Against this may be argued that there is no evidence, historical or morphological, for this assumption. (3) It sprang from a fertile hybrid or hybrids between *S. alterniflora* and *S. stricta*, and has assumed the character of a particularly vigorous and fairly constant species. In favour of this theory two circumstances may be adduced: first, the fact that *S. Townsendi* combines actually not a few of the distinctive characters of both species; and secondly, that it has an almost exact parallel in *S. Neyrautii*, which was described as a hybrid of *S. alterniflora* and *S. stricta* from specimens found growing among the parents in the estuary of the Bidassao. This *S. Neyrautii* differs from *S. Townsendi* only in the more pronounced accentuation of the characters derived from *S. alterniflora*. The Adour and the Bidassao Rivers on one side and Southampton Water on the other are the only two places in the world, so far as we know, where *S. alterniflora* and *S. stricta* meet; and it would be a case of extraordinary coincidence if

S. Townsendi and *S. Neyrautii* should after all be found to have been introduced from some other part of the world just into those two localities. An attempt of artificial crossing of *S. alterniflora* and *S. stricta* should be made. Dr. Stapf finally spoke of the grass as a mud-binding and land-reclaiming species.

At the same meeting papers were read by Mr. H. N. Ridley on a collection of plants from Gunong Tahan, Pahang, by Mr. H. C. Robinson, and on some marine Algæ from the Red Sea, by Prof. R. J. Harvey-Gibson, based on material collected by Mr. Cyril Crossland in 1904 and 1905. The total number is thirty-five species; twelve belong to the *Chlorophyceæ* and as many to the *Phæophyceæ*, with eleven *Rhodophyceæ*. In an appendix the following Phanerogams were mentioned as having been collected at the same time: *Cymodocea nodosa*, *Halophila stipulacea*, *Najas marina*, and fragments of *Salicornia fruticosa*.

The volume on *Forage Crops for Soiling, Silage, Hay and Pasture*, by E. B. Voorhees, D. Sc. (New York: The Macmillan Co., price 6s. 6d.), treats of the different plants that are or may be cultivated for animal food which may be consumed in the field, cut and fed green, preserved in silos, or dried as hay. Particulars are given as to the preparation of the soil and seeding, the manures and tillage, the harvesting and yield, and the feeding-value, determined by chemical analyses, of the various crops. The volume must be of great practical value to the farmers of the United States, but the climatal conditions of Britain are so different that the majority of the plants dealt with could not be grown to any advantage with us. On the other hand, it is a most valuable work for our tropical and subtropical colonies, and we commend it to agriculturists in those lands, being assured that they will find much practical information as to possible forage crops.—W. C.

In *Seed and Soil Inoculation for Leguminous Crops* ("Country Life" Office, 1s.), Prof. Bottomley recites the progress of our knowledge in regard to the influence of bacteria in fixing nitrogen for the use of clover and other leguminous plants. Nobbe's production of "Nitrogin" failed because the bacteria died before application to the soil. The United States Department of Agriculture send it out in liquid form in bottles. Prof. Bottomley has discovered that he can preserve the vitality of the bacteria in a dry condition, and he has distributed freely a large number of packages, which have been tried in various places in Britain and Ireland with remarkable success. The results of these experiments and the prospective gain to agriculture form the bulk of his interesting pamphlet.—W. C.

The Rev. John Fergusson, who died in Edinburgh on August 6, 1907, was for many years well known as a worker at British Mosses, the study of which he took up in 1866. He was born in 1834 at Kerrow, Glen Shee, Forfarshire, and his earlier researches were connected with that county and are embodied in a paper published in Trans. Bot. Soc. Edinb. x. 245 (1869); in this between one and two hundred species new to the county are enumerated,

including some new to Britain. In 1869 he removed to New Pitsligo, in Aberdeenshire, and in 1875 he was inducted to the parish of Ferns, near Brechin; his further discoveries appeared in *Science Gossip* and elsewhere. At one time Fergusson contemplated publishing a manual of British Mosses; he had an extensive correspondence with Wilson, Hunt, and other leading British bryologists, and was generous in distributing specimens. His name stands as the authority for at least one species new to science—*Philonotis adpressa*—and he added many species to the British flora. The University of St. Andrews, where he had been a student, bestowed upon him in 1896 the degree of Doctor of Laws.

We have received the first part of what will evidently be an important book—the *Flore Générale de l'Indo-Chine*, which is being published by MM. Masson & Cie., Paris, under the direction of Professor Lecomte, of the Muséum d'Histoire Naturelle. This first instalment contains the *Ranunculaceæ*, *Dilleniaceæ*, *Magnoliaceæ*, and *Anonaceæ*, and is the work of MM. Finet and Gagnepain; thirty-four of the hundred and eight species described in it are new, and there are fourteen excellent plates by C. Kastner. It is expected that the work will occupy seven volumes of about five hundred pages each. The arrangement followed will be that of Bentham & Hooker, but the volumes will not appear in their sequence; thus the next instalment, which will appear early in the year, will begin vol. vi., and will include the *Hydrocharideæ*, *Burmanniaceæ*, and *Scitamineæ*. The price of each fascicle is 10 francs.

We are glad to see that the Lichen Exchange Club suggested by Mr. A. R. Horwood in our November number has become an accomplished fact. A pamphlet of four pages containing the rules and a list of "exempta"—"lichens of universal distribution which, unless the specimens differ from the typical form, need not be sent for exchange"—may be obtained from Mr. Horwood, the Secretary, at the Corporation Museum, Leicester. Specimens for distribution or identification should be sent to the distributor for the year, the Rev. H. P. Reader, Holy Cross Priory, Leicester. Sixteen members have been already enrolled.

A list of the alterations in the nomenclature of the *List of British Seed-plants* indicated in our last issue has been printed in slip form and will be sent out in future with the List. Those who have already purchased the List can obtain a copy of the alterations on application to the Keeper of the Department of Botany.

We understand that the new edition of the *London Catalogue*, upon which Messrs. W. R. Clarke & E. S. Marshall have been for some time engaged, will shortly be issued, as will also the more elaborate Catalogue by Mr. G. C. Druce, which will be published by the Clarendon Press.

The Herbarium of Miss C. E. Palmer, which contains many plants sent by George Don to her ancestress the Countess of Aylesford, for the purpose of being drawn, has been given to Mr. G. C. Druce. The beautiful water-colour paintings are still in the possession of the Countess of Dartmouth, another of Lady Aylesford's descendants.

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THE BRITISH SPECIES OF *THYMUS*.

By K. Domin & A. Bruce Jackson.

Thymus is one of the many genera which present special difficulties to the systematist from the fact that it includes a large number of critical forms which are very hard to define. This is especially the case in the Balkan Peninsula, the countries surrounding the Black Sea, the Orient, and the West Mediterranean region—the headquarters of the genus—where the greatest number of species are known to occur. The watershed of the Danube affords a great variety of interesting plants which thin out towards the north-west, the warm rocks of Central Bohemia and the steppes of North Bohemia being the northernmost limit of these South-east European species. Central and North Europe and the Alps yield only a few species, but these are represented by an extraordinary number of variable forms.

Until recently, the characters employed for differentiating the species and varieties of *Thymus* were of doubtful value, and many plants which have been given specific rank can hardly be considered more than forms, or at the most varieties. Moreover, it would be necessary if these characters, based upon the size and colour of the flowers, the degree of pubescence of the calyx and stems, the shape of the leaves, the smell, the more or less elongated branches, &c., were used as distinctions to describe new species *ad infinitum*, after the manner of Opiz and Déséglise. This would render an already complicated synonymy still more cumbersome.

Borbás, who published a revision of *Thymus* ("Symbolæ ad Thymos Europæ Mediæ praecipue Hungariæ cognoscendos," *Math. és Természet Közlemények Körtet*, xxiv. pp. 39–116, Budapest, 1890), which treats especially of the Central and South-east European forms, laid stress upon characters derived from the nervation of the leaves and the hairiness of the stems, which at the best are artificial and ill-defined.

Velenovský seems to have been the first to recognize the value of characters drawn from the arrangement of the flowering and barren branches, and on this basis he framed a more natural grouping of the plants than had been adopted by previous authors. This is evident from his "Vorstudien zu einer Monographie der Gattung *Thymus*," *Beih. z. Bot. Centralbl.*, Berlin (1906). Borbás, and especially Velenovský, show us how important a part hybridization plays in *Thymus*, and Domin has found that wherever two species grow in close proximity many forms occur, which are certainly the result of crossing; as is the case with many species of *Potentilla* and some other genera.

It is the occurrence of such hybrids which renders the study of this genus an unusually difficult one. Dried specimens, often very imperfect, because failing to show the mode of branching, are frequently not determinable. It is absolutely essential to have complete plants to be quite certain to which species they belong.

Thymus Serpyllum L. — Linnæus (*Sp. Pl.* p. 590 [1753]) described his *Thymus Serpyllum* as follows: "Thymus floribus capitatis caulibus repentibus, foliis planis obtusis basi ciliatis. *Fl. Suec.* 477. *Mat. Med.* 282." Now it is evident that this description cannot be made to embrace all our British plants, as there is only one species with flowers in heads and creeping stems which it fits.

He supplements the above description by the following synonyms, and adds diagnoses of four varieties:—

"Thymus repens, foliis planis, floribus verticillato-spicatis. *Hort. Cliff.* 306. *Roy. Lugdb.* 325.
Serpyllum vulgare minus. *Bauh. Pin.* 220.
Serpyllum vulgare. *Dod. Pempt.* 277.
β Serpyllum vulgare majus. *Bauh. Pin.* 220.
γ Serpyllum vulgare minus capitulis lanuginosis. *Tournef. Inst.* 197. *It. Gotl.* 219.
δ Serpyllum angustifolium hirtum. *Bauh. Pin.* 220.
ε Serpyllum foliis citri odore. *Bauh. Pin.* 220.
Habitat in Europæ aridis apricis."

These, however, have nothing to do with the plant just described, and this conclusion is borne out by an examination of the Linnean types of *Thymus* at Herb. Mus. Brit. described in *Hortus Cliffortianus*, 306, which we found for the most part to be the *Thymus ovatus* of Miller, to be referred to again hereafter, and not the plant described in *Sp. Pl.* There is no doubt what plant Linnæus refers to in his diagnosis, as in *Flora Suecica*, 173 (1745), there is so clear a description as to leave no doubt that he had before him a specimen of *T. Serpyllum* (sensu strictu). Doubtless many will think it desirable to retain the name *Serpyllum* in a collective sense, taking the view that Linnæus has united under that name *T. Chamædrys* Fr. (*T. glaber* Miller), *T. ovatus* Miller, *T. præcox* Opiz, and some other species which do not occur in England; but this is hardly a correct view, inasmuch as it is not possible to retain a collective species for several species belonging to different well-marked sections of the genus, and also because we consider it inadvisable to retain the name in a collective sense when the description of the plant to which it refers is a segregate species.

In many other genera the Linnean species are collective, and embrace several very distinct forms, but in these cases his diagnoses usually refer to all the forms, and not to one only. Fries (*Nov. Fl. Suec.* ed. ii. p. 196 (1828)) makes the position perfectly clear. He gives a very complete and correct description of *T. Serpyllum* L. (excluding syn. and var.), showing that the Linnean name can only be used for the plant from South Sweden, which is the Linnean type. It is the same species as that described by Persoon (*Synopsis Plantarum*, ii. p. 130 [1807]) as *T. angustifolius*, which is a form or at most a narrow-leaved variety of the Linnean species. Fries says (*l. c.*):—

"Brevitatis studio omnes de Serpyllis controversias immensamque synonymiam hoc loco non teram. Apud nos se paulo

aliter quam apud exteros Thymi habere videntur. Duas facile in Scandinavia distinguimus species, separatim nascentes, ut altera alteram sæpe excludat. Hæ eædem sunt, quas primi Patrum jam distinxerunt, habitu & vegetatione omnino differentes. Staminibus exsertis (qualia vero semper fere apud nos!) & inclusis, corollis majoribus & minoribus, foliis pilosis & glabris e. s. p. nil fere tribus, ut totus Labiatarum ordo demonstrat. Ex his distinctæ sunt usque ad 8 species v. c. in Raji synopsi, quas parum notabiles inveni. Has Linnæus omnes quidem junxit, sed præsentem solum legit & describit, & in synonymis *Fl. Su.* citat, ut hic procul dubio est verus *Th. Serpyllum* L.!"

There is no specimen of *T. Serpyllum* in the Linnean herbarium.

Having disposed of *T. Serpyllum* L. (excl. var. et syn.), it will be necessary to explain the synonymy of the commonest species of *Thymus* in Europe, including Britain, *viz.*:—

Thymus ovatus Miller.—This species, although bearing a combination unfamiliar to British botanists, is well-known under this name on the Continent, as it is possible to see from the writings of Borbás and Velenovský. It is described by Miller (*Gard. Dict.* ed. 8 (1768)), as follows:—

"7. THYMUS (*ovatus*) caulibus decumbentibus, foliis ovatis glabris, floribus verticillato-spicatis. *Thyme with strong trailing stalks, oval smooth leaves, and flowers growing in whorled spikes.* Serpyllum vulgare majus flore minore. Bot. Par. 183."

It is quite clear from the type specimen in Miller's herbarium at the British Museum, which we have recently examined, that this is the *T. Chamædrys* of English floras, but not of Fries. *T. ovatus* differs markedly from *T. Serpyllum* in being without stolons, and having only a terminal elongated and not capitate inflorescence, and quite different leaves.

Thymus glaber Miller.—The third species occurring in Britain is *Thymus glaber* Miller, which is found in the mountains of Europe and in less elevated positions in Scandinavia. We have also seen specimens in British herbaria from localities in Scotland, Yorkshire, and North Wales. This species is thus described by Miller:—

"6. THYMUS (*glabrus**) floribus capitatis, caulibus decumbentibus, foliis lanceolatis glabris. *Thyme with flowers growing in heads, trailing stalks, and smooth spear-shaped leaves.* Serpyllum vulgare majus, flore purpureo. E. B. P. 220."

This diagnosis exactly fits the type specimen of *T. glaber* preserved in Miller's herbarium, and that this is identical with Fries's type specimen of *T. Chamædrys* is also quite clear from a specimen of the latter preserved in the national collection. Although *T. Chamædrys* is used in a correct sense for *T. glaber* by continental botanists, Miller's name being sixty years earlier must stand. This change is all the more desirable in view of the fact that the name *T. Chamædrys* has often been used to designate several distinct species.

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* Corrected to *glaber* in errata.

Thymus præcox Opiz.—The last species with which we propose to deal at present is *Thymus præcox* Opiz. We have seen plants in English herbaria from Scotland, Surrey, Oxford, and Cornwall which probably belong here, but further study of the living material is necessary. Opiz described his species in his *Naturalientausch*, p. 40 (1824), and in *Flora*, vii. Beil. i. 84 (1824):—"Caule repente, ramis adscendentibus abbreviatis, pilis patentibus, foliis obovatis obtusiusculis, petiolis pilis longissimis margineque ciliatis, floralibus subsessilibus latioribus, corollis calice longioribus, staminibus inclusis."

We contrast below the characters of the four species dealt with:—

I. Suberecti Velen. *l. c.* p. 278.

1. *Thymus ovatus* Miller.—*Ramis erectis ramosis inflorescentiâ terminali* quadrangulis plerumque bifariam hirsutis, *foliis majoribus ovatis* vel ovato-oblongis tenuibus planis basi ad margines ciliatis usque omnino glabris, nervo medio tenui prominulo secundariis sæpe ad margines percurrentibus, *inflorescentia elongata*, verticillastris ± remotis (nunquam capitulatis!), floribus pro more minoribus. Stolonibus nullis.

II. Repentes Velen. *l. c.* p. 280.

2. *T. Serpyllum* L.—*Ramis floriferis abbreviatis numerosis axillaribus* (nec terminalibus) sæpe circacircum breviter pilosis, *foliis parvis plerumque linearibus angustis* rarius anguste obovato-oblongis *subplicatis* glabris hirsutisve, nervo primario ± prominulo, secundariis sæpe obsoletis, *floribus in capitule brevum congestis. Stolonibus valde elongatis repentibus sterilibus.* Præcipue arenosorum et ericetorum incolæ.

3. *T. præcox* Opiz.—Ramis elongatis sterilibus et floriferis abbreviatis axillaribus excellens, sed differt foliis multo majoribus latioribusque planis sæpe spathulatis vel late obovatis, *nervis magnis prominulis, capitulis majoribus minus congestis* necnon florendi tempore præcocioribus. Loca arida collesque calcareos prædiligit.

4. *T. glaber* Mill. (*T. Chamædrys* Fr.).—Habitu *T. ovati* formis nonnullis haud dissimilis sed *ramis longioribus repentibus vel procumbentibus sterilibus* nec inflorescentia terminatis, primo aspectu facile dignoscendus. A speciebus præcedentibus sectionis Repentes *ramis sterilibus* brevioribus, foliis *majoribus ovatis vel ovato-oblongis tenuibus magnis discoloribus planis* sæpius breviter petiolulatis glabris, nervatione *T. ovato* congruentibus, *ramis floriferis magis elongatis*, quadrangulis bifariam pubescentibus vel subglabris *inflorescentia subcapitata longiore, floribus læte purpureis* vel roseis habitationeque alpina vel subalpina discrepat.

Hybrid Thymes appear to be fairly numerous in England judging from the material we have examined, *T. Serpyllum* × *ovatus* perhaps being the commonest cross. Some of these show the influence of *Serpyllum* parentage, but differ in their shorter stolons, terminated by an inflorescence, are more robust, and have looser heads. Other forms are nearer *T. ovatus*, but can be

easily distinguished by the faint nervation of the leaves, which are smaller and narrower, the flowers in denser verticillasters, and the more decumbent stems. The hybrids are often characterized by having larger flowers than those of the parents.

In a future paper we shall discuss more fully the distribution of *Thymus* in Britain.

ALABASTRA DIVERSA.—Part XVI.

By Spencer le M. Moore, B.Sc., F.L.S.

New or Rare African Plants.

Rubiaceæ.

Pentas nobilis, sp. nov. Fruticulosa ramulis crebro foliosis teretibus griseo-pubescentibus, foliis brevipetiolatis ovatis obtusiusculis breviterve acuminatis basi rotundatis necnon leviter obliquis membranaceis utrobique puberulis costis ordinis secundi utrinque 10 ascendentibus paullo arcuatis, stipulis 3–5-fidis petiolos longe excedentibus, floribus pro rata magnis brevipedicellatis sessilibusve in cymis laxis paucifloris pubescentibus dispositis, bracteis setaceis quam calyx plane brevioribus, calycis tubo (ovario) campanulato longitrorsum costato dense griseo-pubescente limbo brevi lobis 5 (nonnunquam 6) elongatis subulato-linearibus inter se inæqualibus onusto, corollæ tubo calycem circa 6-plo excedente ad normam generis lato faucibus parum dilatato extus pubescente lobis 5 (raro 4 vel 6) oblongis acutis quam tubus multo brevioribus, staminibus infra fauces insertis, ovario 2-loculo, stylo florum a me scrutatorum incluso, capsulis anguste ovoideis coriaceis puberulis valvis persistentibus donatis.

Hab. Rhodesia, Mazoe, on precipitous side of Iron-mask Hill; *F. Eyles*, 248, 496.

Folia 8·0–9·0 × 4·0–4·5 cm., in sicco brunnea, aliquantulum nitida; costæ utrinque satis perspicuæ; petioli griseo-pubescentes, circa 0·5 cm. long. Stipulæ 0·8–1·5 cm. long., pubescentes. Cymæ floribus exemptis circa 6·0 × 5·0–7·0 cm. Pedicelli 0·1–0·5 cm. long. Ovarium 0·5 × 0·45 cm. Calycis limbus indivisus 0·3 cm. long.; lobi longiores 1·5 cm. breviores 1·0 cm. long. Corollæ albæ tubus 8·0–9·5 cm. long., inferne 0·3 cm. faucibus hirsutis 0·4 cm. lat. Filamenta ad 1·4 cm. infra os inserta, 0·4 cm. long.; antheræ 0·9 cm. long. Stylus ægre 8·0 cm. long.; hujus rami linearioblongi, 0·35 cm. long. Capsula calycis reliquiis coronata, circa 9-costata, brunnea, fere 1·5 × 0·8 cm.

A very fine plant, differing from *P. longituba* K. Schum., known to me only by description, among other characters, in the ovate leaves rounded (not acute) at base, and the shorter pubescent (not tomentose) corolla with shorter lobes.

P. Woodii S. Elliot in Journ. Linn. Soc. xxxii. p. 434.

Mazoe; *F. Eyles*, 275.

A Transvaal plant, now first, it is believed, added to the tropical African flora.

Pentanisia spicata, sp. nov. Caule e rhizomate lignoso sat gracili ascendente cito ramoso ramis procumbentibus crebro foliosis griseo-pubescentibus, foliis sessilibus subsessilibusve anguste lineari-lanceolatis apice acutis ipso apiculatis utrinque scabriuscule puberulis, stipulis e basi lata petiolis adnata in setas 3–4 brevibus exeuntibus, floribus parvulis sessilibus brevissimeve pedicellatis in pseudospicam griseo-pubescentem folia multo excedentem cito ordinatis, calycis pubescentis lobo unico foliaceo lanceolato-oblongo acuto puberulo reliquis 4 minutis setiformibus, corollæ tubo calycem longe excedente maxime attenuato sursum subito dilatato faucibus brevissimis lobis 5 ovato-oblongis obtusis, staminibus breviter exsertis, ovario 2-loculo pubescente, stylo incluso quam rami sui simplices duplo longiore.

Hab. Mazoe, Rhodesia, summit of Iron-mask Hill; *F. Eyles*, 522.

Folia solemniter 2·0–3·0 cm. long., 0·3–0·5 cm. lat., in sicco viridia subtus pallescentia; costa centralis subtus prominens. Stipulæ circa 0·3 cm. long. Spicæ mox adusque 10·0 cm. long. Pedicelli dum adsint crassi, summum 0·1 cm. long. Ovarium cylindraceum, 0·15 cm. long. Flores dilute purpurei. Calycis lobus unicus 0·3–0·5 × 0·1–0·15 cm.; lobi reliqui 0·05–0·1 cm. long. Corollæ tubus circa 0·5 cm. long., 0·02 cm. diam.; lobi ægre 0·2 cm. long. Filamenta 0·12 cm., antheræ 0·06 cm. long. Stylus 0·5 cm. long., hujus rami 0·25 cm. Fructus ovoideus, calyce persistente coronatus, pubescens, 0·2 cm. long.

A plant with corollas like those of *P. annua* K. Schum. and *P. cærulea* Hiern, but so different from both in habit, clothing, shape of leaf, &c., as to render further details unnecessary. The most striking feature is the spicate inflorescence, a character in which it is unique among its congeners.

Compositæ.

Erlangea (§ Eu-Erlangea) **Eylesii,** sp. nov. Herba bipedalis caule erecto gracili frequenter folioso albo-tomentello, foliis alternis sessilibus lineari-lanceolatis vel anguste lanceolato-oblongis acutis basi obtusis rotundatisve vix amplexicaulibus supra scabriusculis subtus albo-tomentellis, capitulis pro rata submediocribus in cymis terminalibus paucicephalis bracteatis dispositis circa 24-flosculosis, involucri turbinato-campanulati 4-serialis albo-pubescentis phyllis lineari-lanceolatis exterioribus serr. tribus quam intima manifeste angustioribus omnibus apice breviter spinuloso-acuminatis, flosculis bene exsertis, achæniis turbinatis 5-costatis puberulis, pappi setis paucis caducissimis scabriusculis achænia plerumque excedentibus.

Hab. Mazoe, at foot of granite hills; *F. Eyles*, 309.

Folia 4·5–7·0 cm. long., 1·0–1·5 cm. lat., summa gradatim imminuta et tandem in bracteas transeuntia. Cymæ 3·0–5·0 × 3·0–5·0 cm. Bracteæ inferiores lanceolatæ, superiores anguste lineares, omnes acutæ, ± 0·5 cm. long. Involucrum 0·8–0·9 cm.

long., apice 0·6 cm. diam.; phylla extima 0·6 cm., intermedia 0·7 cm., intima 0·85 cm. long., omnia membranacea necnon brevissime scarioso-marginata. Flosculi purpurei raro punicei. Corollæ 0·75 cm. long. Achænia brunnea, 0·15–0·2 cm. long.; pappi setæ 0·2–0·3 cm. long.

A very distinct and elegant species, with nearest affinity to *E. Schinzii* O. Hoffm. From this it differs in indumentum, shape of leaf, shape of involucre and involucral leaves, &c.

Vernonia (§ Cyanopis) **porphyrolepis**. sp. nov. Planta 1–2-metralis, caule erecto valido tereti pluristriato pubescente tandem glabrato, foliis lanceolato-oblongis apice mucronatis basi obtusis subrotundatisve petiolo brevi canaliculato fultis chartaceis supra scabride puberulis subtus molliter pubescentibus tomentellisve, capitulis parvis circa 20-flosculosis in panicula terminali laxiuscula multicephala bracteata folia longe excedente pubescente digestis, pedunculis propriis involucro longioribus brevioribusve pubescentibus, involucri campanulati 5-serialis phyllis extimis abbreviatis subulatis reliquis gradatim longioribus oblongo-lanceolatis trinervibus omnibus acuminatis dorso microscopice puberulis purpureis paucis exterioribus patenti-recurvis, corollis exsertis, achæniis oblongo-turbinatis 4-costatis pilis simplicibus glandulis intermixtis pubescentibus, pappi setis exterioribus levibus quam interiores scabriusculæ sordide albæ multo brevioribus.

Hab. Mazoe, on Iron-mask and Bernheim Hills; *F. Eyles*, 371.

Caulis deorsum 0·7 cm. diam., in sicco late brunneus. Folia 7·5–8·5 cm. long., 2·2–2·5 cm. lat., superiora circa 5·0 × 1·0 cm., summa imminuta et tandem bracteis similia, in sicco viridia; petioli 0·5 cm. long. vel minus. Inflorescentia circa 20·0 × 15·0 cm. Bracteæ lineari-lanceolatæ vel lineares, ± 0·5 cm. long. Pedunculi proprii 0·3–1·0 cm. long. Capitula 0·8 × 0·7 cm. Involucri phylla extima 0·15 cm., intermedia ± 0·35 cm., intima 0·5 cm. long. Achænia 0·2 cm. long.; pappi setæ exteriores 0·05 cm., interiores 0·5 cm. long.

On a first view this might be taken for *V. Elliotii* S. Moore, which, besides having somewhat different leaves and flower-heads and simply glandular achenes, is a member of § *Lepidella*. The affinity is with *V. Burtoni* Oliv. & Hiern, which has elliptical, nearly glabrous foliage leaves, involucres with a greater number of pubescent, not purple, leaves and nearly glabrous achenes.

Vernonia (§ Stengelia) **integra**, sp. nov. Fruticosa, orgyalis, ramosa, ramulis teretibus pluristriatis dense griseo-pubescentibus, foliis parvis oblanceolatis vel oblanceolato-obovatis obtusis basi in petiolum brevem attenuatis margine integris membranaceis supra scabriusculis subtus griseo-tomentellis, capitulis submajusculis multifloscu losis ramulos superiores solitatim terminantibus ita corymbum paucicephalum foliis intermixtum referentibus, pedunculis propriis nunc subnullis nunc capitulum æquantibus excedentibusve, involucri campanulati circa 6-serialis griseo-pubescentis phyllis oblongis extimis abbreviatis intermediis et interioribus appendice spathulato-oblonga obtusa foliacea onustis intimis quam interiora paullo brevioribus anguste lineari-lanceolatis acutis, flosculis bre-

viter exsertis, corollæ tubo magna pro parte attenuato juxta limbum subito dilatato, achæniis cylindricis pluricostatis breviter setosis, pappi setis pluriseriatis dilute stramineis paucis extimis quam reliqua complanata scabriuscula manifeste brevioribus.

Hab. Mazoe, 4300–4800 ft.; *F. Eyles*, 277.

Foliorum limbus 3·0–4·5 × 1·0–2·0 cm.; costæ secundariæ subtus subperspicuæ; petioli 0·5–0·7 cm. long., dense griseo-pubescentes. Capitula pansa 1·8 × 2·5 cm. Involucri phylla extima circa 0·3 cm., intermedia 1·0 cm., interiora 1·5 cm., intima 1·2 cm. long. Flosculi subalbidi. Corollæ pars attenuata 1·0 cm. long., pars dilatata 0·4 cm.; lobi anguste triangulares, 0·2 cm. long. Styli rami 0·5 cm. long. Achænia 0·4 cm., pappi setæ extimæ 0·4 cm. interiores circa 0·8 cm. long.

Easily distinguished from *V. Tenoreana* Oliv., *V. Woodii* O. Hoffm., and their allies by the small entire leaves and the spathulate foliaceous appendages to the involucral leaves.

Felicia Noelæ, sp. nov. Herbacea, sat elata, caule saltem sursum ramoso ut rami laxifoliati longitrorsum striato hispidulo-puberulo, foliis alternis sessilibus lineari-oblongis obtusis integris superioribus minoribus omnibus scabride-hispidulis, capitulis parvis multifloseulosis in corymbo brevi raribracteato paucicephalo sublaxo pubescente dispositis, pedunculis propriis gracilibus capitula excedentibus, involucri late campanulati hispiduli phyllis 2-seriatis lineari-oblanceolatis acuminatis rigidis margine anguste scariosis, flosculis exsertis omnibus fertilibus, ligulis ultra 20 1-seriatis oblongis integris in sicco albis, achæniis adhuc crudis compressis margine hispidulis, pappi setis scabridis albis.

Hab. Mwanza, west side of Lake Victoria Nyanza; *Miss E. F. Noel.*

Folia inferiora 3·5 cm. long., 0·5 cm. lat., trinervia, nervis subtus eminentibus; folia superiora ± 1·0 × 2·0 cm., uninervia. Corymbi circa 4·0 × 2·5–3·0 cm. Bracteæ anguste lineares, 0·2–0·5 cm. long., scabride hispidulæ. Pedunculi proprii capitulorum profecto evolutorum 0·5–1·0 cm. long. Capitula 0·4 × 0·8–1·0 cm. Involucri phylla 0·25 cm. long. Ligulæ (lamina) 0·4 cm. long., 0·1–0·15 cm. lat., tenuissime 4-nerves. Antheræ vix 0·1 cm. long. Achænia 0·065 cm. long.; pappus 2·5 cm. long.

Apparently near *F. Fischeri* O. Hoffm., known to me only by description, from this differing in the broader lower foliage leaves, the shape of the leaves of the involucre, and the scabrid (not lengthily ciliate) pappus-hairs.

Sphæranthus (§ Pauciflori) **Randii**, sp. nov. Caule flaccido verisimiliter plus minus repente anguste alato glabro, foliis sessilibus anguste linearibus apice acutis leviterque induratis basin versus sensim attenuatis margine distanter denticulatis denticulis callosis firme membranaceis subtus microscopice puberulis, capitulorum glomerulis parvis solitariis terminalibus pedunculatis globosis, glomerulorum bracteis 1-serialibus ovatis breviter aristato-acuminatis margine ciliolatis sursum puberulis, bracteis capitulorum præcedentibus similibus sed paullo minoribus (interioribus spathulato-oblongis), involucri phyllis 4 late oblongo-spathulatis

truncatis apice erosulis carinatis carina juxta apicem levissime cristulata, corollis fll. ♀ (quorum exstant pro capitulo 3–5) cylindricis attenuatis fll. ☿ 2 leviter infundibuliformibus (sc. tubo basin versus paullulum et sensim coartato), fll. ♀ achæniis papillosis, ☿ glabris.

Hab. Rhodesia, Salisbury; *R. F. Rand*, 527. Mazoe, on bank of stream flowing from granite; *F. Eyles*, 405.

Folia vulgo 3·0–5·0 cm. long., 0·15–0·3 cm. lat., glandulis immersis copiose induta. Pedunculi circa 1·0–2·0 cm. long. Glomeruli rite evoluti 0·8 cm. diam. Bracteæ exteriores 0·3 × 0·2 cm.; involucrorum interiorum bracteæ 0·3 × 0·12 cm. Involucri phylla ægre 0·3 cm. long. Flosculi dilute purpurei. Corollæ fll. ♀ 0·2 cm. fll. ☿ 0·15 cm. long. Achænia valde cruda circa 0·075 cm. long.

To be compared with *S. gomphrenoides* O. Hoffm., a species I have not seen, which is described as possessing shorter leaves, biseriate bracts of the glomerula, the outer series differing in shape from the inner, bracts of the three-leaved involucres with a long appendage, and corollas of the female florets widened at base and at throat.

Dr. Rand's specimen, gathered in 1898, was not described, as it was undesirable to dissect the only glomerule the specimen bears.

Helichrysum (Chrysolepidea § Stœchadina) **Rogersii**, sp. nov. Planta tomento denso albo-araneoso vestita, caule sat gracili lignoso sursum ramoso crebro folioso, foliis parvis sessilibus lineari-oblongis apice obtusis haud mucronatis nequaquam decurrentibus margine revolutis ramulorum apicem attingentibus, capitulis parvis subsessilibus campanulato-cylindricis homogamis 15–17-flosculosis in glomerulum densiusculum ramulos terminantem necnon a foliis ultimis aliquanto imminutis involucratum digestis, involucri 4-serialis glabri phyllis spathulato-oblongis obtusis vel acutiusculis haud radiantibus sursum citrinis interioribus quam reliqua paullo brevioribus, antherarum caudis simplicibus, achæniis (crudis) cylindricis glabris, pappi setis scabridis albis.

Hab. Port Alfred, Cape Colony; *Rev. F. A. Rogers*, 944.

Planta saltem spithamea. Folia ± 1·0 cm. long., 0·2–0·3 cm. lat., summa circa 0·5 cm. long. Glomeruli circa 1·5 cm. diam. Capitula 0·5 cm. long., 0·35 cm. lat. Involucri phylla extima 0·35 cm. long., interiora 0·4 cm. long. Corolla 0·3 cm. long. Achænia ægre 0·1 cm. long; pappus 0·35 cm. long.

Near *H. rutilans* Nees, from which it differs among other points in the foliage and involucral leaves.

Helichrysum stenopterum DC. Prod. vi. 201, var. citrinum, var. nov. A typo discrepat solummodo ob involucri phylla citrina nec aurea.

Hab. Mazoe; *F. Eyles*, 363.

"A lax straggling herb amongst dense undergrowth on the edge of marsh jungle."

Geigeria rhodesiana, sp. nov. Herbacea ramis sat validis crebro foliosis scabriuscule puberulis, foliis lineari-lanceolatis

obtusis apice sæpe nigro-mucronulatis basin versus attenuatis longe decurrentibus ita caulem anguste alatum sæpe ancipitem referentibus margine integris raro denticulatis uninervibus vel nervis tribus percursis scabriusculis, capitulis in glomerulum ramos vel ramulos (hos brevissimos) terminantem a foliis ultimis arcte involucratum dispositis, involucri subhemisphærici phyllis lanceolato-oblongis exterioribus longioribus foliosis membranaceis acutis dorso puberulis margine ciliatis interioribus coriaceis acuminatis margine longe vel brevius albo-ciliatis, receptaculo convexo, radii flosculis circa 15, achæniis anguste turbinatis setosis, pappi squamis 10 lanceolatis exterioribus obtusis vel acutis vel breviter aristatis interioribus longius aristatis.

Hab. Rhodesia, Mazoe; *F. Eyles*, 318. Melsetter, in short grass near Chirinda; *C. F. M. Swynnerton*, 490.

Planta monente cl. Swynnerton circa trispithamea, diametro tandem sæpe fere metralis. Folia 6·0–9·0 cm. long., 0·8–1·5 cm. lat., in sicco viridia. Glomeruli 2·0–4·0 cm. diam. Involucrum 1·0 × 0·9 cm.; phylla exteriora fere 1·0 cm. long., interiora 0·7 cm. Receptaculi paleæ angustissimæ, 0·25 cm. long. Ligulæ oblongæ, tridentatæ, 0·6 cm. long. Achænia 0·15 cm. long.; pappi squamæ 0·2–0·3 cm. long.

From *G. pubescens* S. Moore this is to be distinguished by the absence of pubescence, the long leaves drying green, and the larger involucres with different involucral leaves.

There are slight differences between the Melsetter and the Mazoe plant, the latter having narrower leaves, the glomerules smaller, and the pappus-scales somewhat shorter, the outer ones never being aristate so far as seen.

Coreopsis insecta, sp. nov. Glabra caule erecto quadrangulari longitrorsum sulcato sursum ramoso, foliis sessilibus bipinnatifidis segmentis primi ordinis ambitu lanceolatis acutis secundi lineari-oblongis omnibus apice pungentibus subcoriaceis glandulis immersis crebro indutis, capitulis mediocribus longipedunculatis paucis (sæpissime 3) ex apice ramulorum oriundis, involucri phyllis exterioribus anguste lineari-oblongis acutis foliaceis interiora ovato-oblonga obtusa chartacea margine decoloria æquantibus leviterve excedentibus, ligulis 8 oblongis vel oblongo-ovatis apice bidentatis subintegrisve plurinervibus, achæniis exalatis oblongis faciebus marginibusque breviter appresse setulosis aristis 2 divaricatis brevibus rigidis.

Hab. Mazoe, Bernheim Hill; *F. Eyles*, 266.

Folia inferiora 6·0–9·0 cm. long., summa gradatim imminuta, rhachis inferne 0·15 cm. superne 0·4–0·5 cm. lat.; segmenta primi ord. 2·0–4·0 cm. long., secundi ± 0·7 cm. long. Inflorescentia adusque 10·0 vel etiam 12·0 cm. long., interdum vero brevior, sæpe bracteis linearibus 1·0–2·0 cm. long. sparsissime onusta. Capitula pansa circa 4·0 cm. diam. Involucri basi pilosi phylla exteriora 1·0–1·15 cm. long., 0·15–0·2 cm. lat.; interiora 1·0 cm. long., 0.35–0·4 cm. lat. Receptaculi paleæ oblongæ, obtusæ, 0·6 cm. long. Ligulæ vix 2·0 cm. long. Disci flosculorum corollæ 0·6 cm. long. Achænia vix matura, 0·55 × 0·12 cm., griseo-fusca, horum aristæ 0·1 cm. long.

Known by the absence of pubescence, together with the lobing of the leaf and the involucres.

Mr. Eyles notes this as common among tall grass.

> **Guizotia Eylesii,** sp. nov. Semimetralis caule erecto quadrangulari pluristriato glabro. foliis sessilibus lineari-lanceolatis obtusis coriaceis supra glabris nitidulisque subtus leviter scabriusculis margine paullo revoluto scabridis necnon calloso-denticulatis, capitulis in cyma sat elongata paucicephala raribracteata hispidula digestis, pedunculis propriis capitula æquantibus vel excedentibus vel ab iis superatis piloso-hispidis, involucri phyllis exterioribus oblongo-lanceolatis acutis foliaceis dorso appresse hispidulis margine rigide ciliatis interioribus oblongo-ovatis acutis dorso hispidulis, ligulis circa 10 bene exsertis, achæniis tetragonis glabris politis.

Hab. Mazoe, in marsh; *F. Eyles*, 349.

Folia 7·0–11·0 × 0·7–1·3 cm., basi brevissime connata, juniora diminuta in bracteas transgressa. Cymæ summum 15·0 cm. long., sæpe equidem breviores. Bracteæ ± 1·5 cm. long. Pedunculi proprii solemniter 0·5–2·0 cm. long. Involucri phylla exteriora 1·0 × 0·2 cm., interiora 0·6 cm. long., phylla omnia 5-nervia. Receptaculi paleæ oblongæ, breviter acuminatæ, margine ciliolatæ, perspicue trinerves, 0·5 cm. long. Ligulæ late oblongæ apice 3-dentatæ, 1·0 cm. long., vel paullo magis; dentes ± 0·2 cm. long. Disci flosculorum corollæ 0·4 cm. long., inferne pubescentes. Achænia basin versus leviter angustata, 0·2 cm. long.

Known at first sight by its long and narrow, coriaceous, almost glabrous leaves and the involucres.

> **Cineraria mazoensis,** sp. nov. Bispithamea, verisimiliter perennis, caule valido fere a basi ramoso, ramis ascendentibus gracilibus crebro foliosis albo-araneosis dein glabris, foliis ambitu reniformi-cordatis 5–6-lobatis sinubis rotundis vel subrotundis lobis dentatis vel dentato-lobulatis supra laxe araneosis mox glabratis subtus griseo-araneoso-tomentellis petiolis laminam subæquantibus basi auriculis 2 parvis instructis, capitulis submediocribus heterogamis radiatis circa 40-flosculosis in corymbis laxis elongatis paucicephalis raribracteatis araneoso-puberulis dispositis, involucri anguste campanulati leviter araneosi phyllis 13 oblongis acutis angustissime marginatis additis calyculi phyllis paucis parvulis lineari-subulatis, ligulis 8 ex involucro plane eminentibus luteis, achæniis compressis margine breviter ciliatis, pappi setis achænia plus quam duplo superantibus scabriusculis albis.

Hab. Mazoe, Iron-mask Hill; *F. Eyles*, 345.

Folia summum 3·0 × 3·5 cm., solemniter 2·0–2·5 × 2·5–3·0 cm., fac. sup. in sicco viridia; petioli graciles, araneosi, 2·0–2·5 cm. long., juxta medium appendicibus 2 integris dentatisve onusti, horum auriculæ circa 0·3 cm. long., vel minus. Corymbi adusque 15·0 cm. long.; pedunculus ± 7·0 cm. Pedunculi proprii summum 3·0 cm. long., sæpissime ± 1·0 cm. long. Bracteæ vetustiores foliis similes sed multo minores, juniores ± 0·25 cm. long., indivisæ, in calyculi phylla transeuntes. Involucrum 0·5 cm. long., sub apice totidem diam. Ligulæ anguste ovato-oblongæ, brevissime 3-denticulatæ,

0·3 cm. long. Disci flosculorum corollæ 0·4 cm. long. Achænia (nondum matura) 0·15 cm., pappus 0·4 cm. long.

Near *C. erodioides* DC. and *C. alchemilloides* DC., but differing from both in the lobing of the leaves, the involucres, number of ligules, &c.

(To be continued.)

CRITICAL STUDY OF *RANUNCULUS AQUATILIS* L. VAR. γ.

By Frederic N. Williams, F.L.S.

(Concluded from p. 22.)

Lusus MACRANTHUS.—Petala calycem duplo superantia. Stamina 9–12.

This is a large-flowered state, usually with more stamens. It is recorded from Switzerland, in the little mountain-lake above Zermatt called the Schwarz-see, at 2518 metres above sea-level (*Buser*); on the Dovre-fjeld, amt of Trondhjem, Northern Norway (*Lindeberg*); and in Swedish Lappland, at Stromås near Piteå (*E. Lundberg*).

Swedish specimens of var. *eradicatus* exactly agree with those of Savoie and Tirol, except that they are more slender and more pilose, the Tirol examples being the most robust and the least pilose, and the Savoie examples ("*lutulentus*") occupying an intermediate position. Songeon and Perrier say nothing in their description about the degree of hairiness in the Savoie plant, nor even mention it, but in authentic specimens it is quite evident.

Lusus FURCATUS. — Pedunculi apice furcati. Petala calyce sublongiora. Stamina 8–10.

Hab. Ala-Tau Mountains, in Russian Turkestan. I have not seen any other examples of *R. divaricatus* with this modification.

Var. 3. RIONII.

Folia 2 cm., segmentis numerosis. Pedunculi 16 mm. Alabastra depresso-globosa. Petala 4–5 mm. long. Stamina pistillis breviora. Carpella minima tantum 1 mm. long., subglobosa numerosa arcte aggregata, in capitulo 80–90.

Syn. *R. Rionii* Lagger, in Flora, xxxi. 49 (28 Jan. 1848); *R. sedunensis* Rion; *R. trichophyllus* var. *Rionii* Rouy & Fouc. Fl. de France, i. 70 (1893); *R. Bauhini* var. *natans* Tausch, in Flora, xvii. 526 (1834)—the earliest name, but not applicable to the present variety, as the character of "*natans*" applies to all forms of the two species dealt with in this paper.

Hab.—Sweden, Switzerland, Austria, Hungary, Afghanistan (*Griffith*), and probably elsewhere. The specimens from North-west India (*Edgeworth*), referred to this variety by Mr. W. P. Hiern, seem to me to belong rather to the common form of *R. divaricatus*, with somewhat larger petals; like the plant from Hanle, in the Rupshu district of the Ladakh province of Kashmir, mentioned in Hooker's *Fl. Brit. Ind.* i. 16. In the locality near

Sion where Rion gathered the original specimens the plant has altogether disappeared or been destroyed, but it grows plentifully between Guercet and Charrat (*Favre*, 1883), and near Saillon and Siders (ex *Gremli*, Swiss Flora, p. 54, transl. Paitson, 1889)—all in the canton of Valais. In Herb. Kew. are authentic specimens gathered by Lagger in ditches near Sion, also by Muret (1875), and from pools at the Château Neuf near Sion, at 600 metres (ex herb. Joad); also examples gathered by Brunet (1861). The Transylvanian plant has pilose achenes, but Simonkai has seen in herb. Schur an example from Nagy-Szeben, in the county of Szilagy, with glabrous achenes. In all Lagger's authentic specimens, including those mentioned above, the achenes are glabrous, but in the original description he does not state whether they are glabrous or pilose. In herb. Simonkai are Swiss examples with pilose achenes. In Joad's examples in Herb. Kew. the plant bearing flowers has pilose pistils; in the more mature example in fruit the achenes are quite glabrous. In Lower Austria it is found in lakes on the Nimmersatteiche, near Feldsberg (*Beck*), and below the Manhartsberg at 200 metres above sea-level (*Dr. Westerleithigen* in Herb. Kew.,—achenes stiffly pilose, with leaves somewhat darker). It is the *R. circinatus* of Baumgarten, Fuss, and other Hungarian authors (in the sense that they use the name of "*R. divaricatus*" for this species). Lagger found it growing far away from any other Batrachian, and not in association with any other member of the section; and flowering late in the season, at the end of August and beginning of September. The occurrence of this variety in Sweden rests on the authority of Hartman, *Handb. Skand. Fl.* ed. 10, suppl. p. 293 (1870), where he refers to Gothland examples "med stånd. kortare än pist." (with stamens shorter than the pistils—which cannot apply to any other form).

Var. 4. Aschersoni.

Folia pedunculo longiora, segmentis quam in forma communi laxius et flaccidius trifurcatis. Flores parvi. Stamina 15 vel pauciora, pistillis breviora. Carpella subglobosa, numero 40 haud excedentia, vix et obsolete rugulosa etiam in achæniis maturis, mucrone brevi instructa.

Syn.—*R. Aschersonii* Freyn in Bot. Centralbl. 1881, beil. n. 26 (iii.), p. 13, t. 1, fig. 2; et in Boiss. Fl. Orient. Suppl. 4 (1888).

Hab.—Egypt. In the oasis of Baharieh, in the Libyan Desert, at the Beln spring near Kasr Bawiti, at the junction of the caravan routes between the Fayoûm and the temple of Jupiter Ammon (*Ascherson* exs. n. 1 in Herb. Berolin.), near Tamieh in the Fayoûm, 1879 (*Schweinfurth* n. 49 in Herb. Kew.), in the Nile Delta at Kafr Hariwan, 1880 (*Schweinfurth* n. 121 in Herb. Kew.) at Gassauin and near Zagazig (*Letourneux*).

Nearly allied to var. 3, which it seems to replace in Egypt (Schweinfurth's n. 121 is labelled "*Rionii*"), but the leaves are fewer and the segments more loosely trifurcate, and fewer achenes in which also the transverse ridges are scarcely perceptible. These two varieties are distinguished from the others in having the stamens shorter than the pistils.

Var. 5. SPHÆROSPERMUS.

"Foliis (uniformibus omnibus) in lacinulas (filiformes) breves rigidulas (undique divergentes) divisis, pedunculis crassis folia superantibus (tandem recurvis), petalis (albis basi flavis) calyce reflexo $2\frac{1}{2}$–plo longioribus (late obovatis) 9–11-veniis, staminibus numerosis (carpella superantibus), spicâ carpellorum globosâ (receptaculo hirto), carpellis subglobosis (dorso vix carinatis rugosis obtusis apice dorsum versus aculeolato-hirtulis, stylo brevissimo crassiusculo ad extremitatem diametri majoris carpelli sito)."

This is the original description, with those characters in parentheses which are identical with those of the common form of *R. divaricatus*. From this it seems to be a connecting link with *R. trichophyllus* in its floral characters, in somewhat the same way that var. *Rionii* is a connecting link with this species in its vegetative characters.

Syn.—*R. sphærospermus* Boiss. et Blanche in Boiss. Diagn. Pl. Or. Nov. ser. 2, v. 6; *R. aquatilis* var. *sphærospermus* Boiss. Fl. Orientalis, i. 23.

Blanche's type-specimens (1847) are in Boissier's herbarium at Chambézy, and were gathered in marshy places near the sea, on the coast of Syria between Alexandretta and Tripoli. A plant gathered near Damascus (*Gaillardot* n. 11 in Herb. Kew.), and on the Euphrates in the vilayet of Aleppo (*Dr. Schlafli* n. 34 in Herb. Kew.) seen also to belong here. Several plants under this name (from Persia, &c.) in Herb. Kew. seen (to me) incorrectly placed here. There is a plant, however, from Akscheher, in the vilayet of Koniah, above the lake of the same name, at one thousand metres above sea-level (*Bornmüller* Iter Anatol. iii. n. 4008 [1899]), which certainly agrees with Boissier's description, and from which specimen I take the following measurements:—peduncles 5–6 cm., leaves 3–4 cm., flowers 2 cm. across. There is also a plant in Herb. Kew. (*Forbes* n. 17) from the valley of the river Echen Chaï (plains of Xanthus), in the vilayet of Aidin, near the town of Gunik, not far from the confines of the vilayet of Koniah, which looks more like *sphærospermus* than anything else, but the specimen is somewhat scrappy and badly dried. Mr. Hiern says that this variety "bears a general resemblance to *trichophyllus*, but the stem is more succulent, the flowers are larger, and on longer and thicker peduncles, and the carpels more numerous: it also bears some resemblance to *pseudo-fluitans*." Post, *Fl. of Syria*, p. 38 (1896), says the plant is common. In all these varieties the geographical details have had to be worked up and amplified from official survey-charts and the specialized maps of military topography. The localities given on specimens are of the most meagre, obscure, and unsatisfactory character, the spelling of the names (even when legible—which is infrequently the case) being unusually wide of the mark. The ordinary gazetteers and geographical indexes, such as Ritter's Index, are rarely of much use, as they contain only the most common names; and, as in the case of Asia Minor, give no clue whatever to the identity of the Turkish, Frankish, and Latin equivalents of the different names applied to the same place. A still

more irritating mode of geographical citation is that so frequently used in the *Fl. Orientalis*, where the location of streams and hamlets in "Phrygia" or "Cappadocia" conveys no information.

Var. 6. CABOMBOIDES.

A weak, elongated, straggling plant, with very flaccid aspergilliform leaves like those of *Cabomba aquatica*, known only from Tasmania, where it grows among pebbles at the bottom of streams in a matted mass. Stamens many, and longer than the carpels, which are also numerous. For details of distribution, see in the first part of the paper (south limit of the species). Mr. Hiern (*Journ. Bot.* 1871, p. 102) refers to a similar form among Pallas's plants in Herb. Mus. Brit., from Sinaia Sopka. The plant was apparently collected by Sokolof; as in Pallas's Account of his Travels (vol. iii. p. 300, of the French translation of *Gauthier de la Peyronie*), he says that he left his companion Sokolof to collect plants on Sinaia Sopka, one of the spurs of the Altaï Range, while he continued his journey. Both this plant, and other specimens like it from Japan in Herb. Mus. Brit., should, however, be referred to var. *Rionii*, which they more resemble in facies than the Tasmanian plant.

Syn.—*R. hydrocharis* var. *cabomboides* Hiern.

Var. 7. TERRESTER.

Compactus, subcæspitans. Folia internodiis longiora, laciniis haud abbreviatis, carnosis fereque cylindricis.

Syn.—*Ranunculus aquatilis omnino tenuifolius* J. Bauhin Hist. Plant. iii. 781, f. 2 (1651); *R. Bauhini* var. *terrestris* Tausch in Flora, xvii, II. 526 (1834); *R. Drouetii* forma *terrestris* G. C. Druce, Fl. Berksh. 10 (1897).

Mr. Druce says:—"This state occurred in a deep ditch near Wytham in the dry summer of 1893. The upper leaves were succulent, but not more entire than is usual." It is probably not uncommon, and to this state of the species may be referred specimens collected near Cong, in the county of Galway, in 1895 (*E. S. Marshall*, n. 1440 in Herb. Mus. Brit.).

Having now summarized the different forms included in the species, it may be interesting here to give a translation of the original description of Tabernæmontanus on which *R. divaricatus* is founded:—"The third kind has a small thin and long root, like the first [Fœniculum aquaticum], with many fibres at the end which are like a fly-swish, and from the root grow many curved or bent slender stems, which from below upwards send out many small branches, furnished on all sides with many small leaves like those of Fennel or Dill. Between the branches and stems grow pretty white flowers, one each on a slender stalk, very like the flower of the water liverwort. When these fall off or wither, there are seen rough-haired heads like those of crowfoot, in which the seeds are inclosed. This plant, like the others, grows in watery places and pools." In the figure, which accompanies the description, the leaves are all stalked (the upper ones are *not* sessile, as in *R. trichophyllus*), and are longer than the peduncles. In the much confused references to Schultz's critical exsiccatæ, n. 404 and

n. 805, chiefly due to trying to adjust the involved descriptions instead of examining the actual specimens, the matter is at once cleared up by comparing the authentic examples in Herb. Kew. (distributed by Schultz). In n. 404, the leaves are shorter than the internodes and shorter than the peduncles, and all petiolate, and the plant is *R. divaricatus*. In "*R. Drouetii*" of English authors the leaves are longer than the internodes. In n. 805 the leaves are shorter than the internodes and longer than the peduncles, and the plant is *R. trichophyllus*. Syme says that in British specimens of the latter the leaves are of about the same length as the peduncles, and Godron, who is unusually accurate, says that the peduncles are short but somewhat longer than the leaves. Schultz's n. 1303 is also *R. trichophyllus*.

In English floras the plant first appears as a species distinct from *R. trichophyllus* in Babington's *Manual*, ed. 4, p. 6 (1856), for the improvements in which edition the author was chiefly indebted to Grenier and Godron's *Fl. de France*. Babington had previously pointed out the different characters of the two species in a paper in the *Annals and Magazine of Natural History*, 1855, p. 390, on the suggestions of Rev. W. W. Newbould made from observations on Cambridgeshire specimens of the two plants some time before (in 1846). There is every reason to believe that *R. trichophyllus* favours calcareous water, where the plant absorbs lime, and thus incrusted the foliage is necessarily more rigid than in the case of *R. divaricatus*, which favours soft peaty water or water which has but little hardness except what is due to the presence of silica from a clay soil; so that in the former the leaf-segments remain more or less divergent, and in the latter they collapse together, when the plant is withdrawn from the water. As Mr. G. C. Druce remarks of "*R. Drouetii*" in his *Fl. Berkshire* (p. 10)—"it would be rather curious to find that it is limited to the area of the Oxford and Kimmeridge Clays." Again, in Middlesex the only chalk portions are two narrow strips in the extreme north-east and north-west of the county. Trimen and Dyer remark in their *Flora*—"There seems, however, to be but one form [of the two species] in the county," and as far as I have seen this is *R. divaricatus*; certainly none of their specimens in Herb. Mus. Brit. belong to *trichophyllus*.

Iconography of the Species.—Passing over the pre-Linnean woodcuts, there seem to be only three good plates of the common form:—(1) Weinmann, Phytanthoza-Iconographia, ii. p. 198, t. 853, fig. c (1745); (2) Sturm, Deutschl. Fl. Heft 67 (1835), "*R. aquatilis* var. *pantothrix*"; (3) Engl. Botany Suppl. 2967 (Aug. 1863), "*R Drouetii*," drawn from a plant gathered by Rev. W. W. Newbould at Comberton, in Cambridgeshire (and reproduced in ed. 3). Of var. 4 a figure is given in Freyn *l. c.*

II.—Ranunculus trichophyllus Godron.

Gren. et Godr. Fl. de France, i. p. 23 (Nov. 1847); *Godron* Fl. de Lorraine, ed. 2, i. p. 15 (1857); *Boreau* Fl. Centr. France ed. 3, ii. p. 11 (1857); *Lamotte* Prodr. Fl. Plat. Centr. France, i.

p. 43 (1877); *Willk. et Lange* Prodr. Fl. Hisp., iii. p. 911 (1880); *Camus* Cat. Pl. France, Suisse, Belgique, p. 2 (1888); *Preston* Fl. Wilts. p. 388 (1888); *G. C. Druce* Fl. Berksh. p. 9 (1897); *Halacsy* Consp. Fl. Græcæ, i. p. 12 (1900); *Bab.* Man. Brit. Bot. ed. 9, p. 6 (1904).

Syn.—*Batrachium trichophyllum* Van den Bossche (1850); *Des Moul.* in Act. Soc. Linn. Bordeaux, xx. p. 456 (1859); *Dumort.* in Bull. Soc. Bot. Belg. ii. p. 216 (1863); *Nyman* Consp. Fl. Europ. 15 (1878); *Corbière* Nouv. Fl. Normand. p. 20 (1894); *Ranunculus paucistamineus* var. *trichophyllus* Formanek in Deutsch. Bot. Monat. xvi. p. 79 (1898).

A specie priori notulis sequentibus diversus.—Glaber vel in parte superiore hispidulus, 3–4 dcm. Caulis sat vel mediocriter ramosus, plus minus elongatus, sæpius præcipue in parte superiore hispidulus, sæpeque paullum succulento-incrassatus. Folia in omnibus formis breviora, nigrescenti-viridia, inferiora plus minus cum mediis petiolata, superiora sessilia, repetite arcteque trifurcata, internodio breviora, patenti-firma; laciniæ, extra aquam plantâ ablatâ, manifeste divergentes subrigidæ, haud in penicillum collabentes. Stipulæ semi-adnatæ rotundatæ minus vaginantes, obtusæ, late auriculatæ, pilosæ vel glabræ. Alabastra globosa. Pedunculi ut plurimum saltem sub anthesi foliis breviores, vel etiam æquilongi, sæpe 2–3 ctim.; fructiferi firmi incrassati, arcuati, basin versus magis curvati. Flores circiter 12–13 mm. in diam., interdum minores, sæpe paullum majores. Petala obovato-cuneata, inferne magis cuneata, paullum recurva, calyce sesqui-rarius duplo longiora; post anthesin citius caduca. Stamina 8–15, pistillorum capitula vix superantia. Spica fructifera 3–4 mm. in diam., apicem versus paullum conica. Receptaculum globosum. Carpella circiter 30, adhuc viridia, sæpius hispida, ad marginem longum superiorem attenuata, lateraliter compressa, basi apiceque attenuata; stylus sat longus angustus trigonus, apicem versus curvatus, basi truncatus, in prolongatione pistilli marginis superioris (ergo ad oram breviorem interiorem) insertus, stigmate multum angustius ovali (vel ellipsoideo) conspicue papilloso.

Hab.—Europe. The northern limit of the species is the river Jesjokka, in the amt of Finmarken, Arctic Norway, near its junction with the rapid Karasjokka, lat. 69° 15′, at a station 319 metres above sea-level (J. M. Norman, Norges Arktiske Flora, i. [1894] 73)—forma *carnosa*. The northern limit of the typical form is at Huso, on the West fiord, opposite Lœdingen, and Fraeno-in-Hammer, on a many-armed peninsula in lat. 68° 15′, in the amt of Nordland (J. M. Norman, *l. c.* ii. [1895] 32). In the latitude of the Arctic Circle the flowers are fully opened by 22nd July. In Sweden it probably does not occur north of the Helsingland district of the lan of Gefteborg, lat. 62° (*Nyman*); and in Finnland only in the south and south-east. I have not seen any specimens from beyond the limits of Europe: examples so named belong to the previous species. Some plants from N. Persia and Turkish Armenia come very near, but they may be referred to large-flowered states of *R. divaricatus*.

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Rouy and Foucaud, *Fl. de France*, i. 67 (1893), unite the two species under the name of "*trichophyllus*," and enumerate twelve forms, which may be disposed of as follows:—*Godroni* and *radians* should be referred to *R. diversifolius* (they are identical in characters and differ only in size, one is twice the size of the other); *Drouetii* is the type of *R. divaricatus*, in which should also be included the forms *Martini*, *paucistamineus*, *lutulentus*, and *confervoides*; *trichophyllus* is the type of the present species; *trichophylloides* and *capillaceus* are not distinguished from the last by any definite character whatever; *britannicus* is stated not to include any French form, and the trifling differences alleged do not apply to the English plant; there remains therefore only the form *filicaulis*, which differs only very slightly from typical *trichophyllus* and includes Norman examples referred to in the next paragraph.

Var. 1. COMMUNIS.

forma TYPICA: ut supra.

As far as the British Isles are concerned both species were treated as a combined unit in Watson's *Topographical Botany*, ed. 1, by reason of the great difficulty experienced in attempting to assign the countries rightly for either; and the same holds for Cybele Hibernica, ed. 2 (1898), where the two species are united. Among the English counties, *R. trichophyllus* has not yet been definitely reported from Cornwall, Nottinghamshire, and Northumberland. In Wales it has been only reported from two counties:—in Carnarvonshire, near the inlet of Llyn-an-afon Aber, and reservoir on Great Orme's Head (*J. E. Griffith*, Flora, p. 2, 1895), and in Glamorgan, on Llangenydd marshes and at Cowbridge (*H. J. Riddelsdell*, Flora, p. 5, in Journ. Bot. 1907, Suppl.). In Scotland, it extends north of the Caledonian Canal as far as the Orkney Islands. South of the Caledonian Canal it is recorded in nine counties:—Dumfries-shire (*Scott Elliot*, Flora, 1896), Kirkcudbrightshire (*Coles*), Ayrshire (*P. Ewing*, Glasgow Cat. Pl. 1899, p. 2), Lanarkshire (Brit. Assoc. Handb. 1901, p. 112), Stirlingshire (*Dr. Stirling* ex P. Ewing, Glasgow Cat. Pl. 1899, p. 2), Perthshire, where it ascends to 300 metres above the hamlet of Corriemuchloch (*F. B. White*, Flora, 1898, p. 47), Angus (*Rev. E. S. Marshall*), Dumbartonshire (*Watt* ex P. Ewing, *l. c.*), Buteshire (*W. Galt*). In Dumfries-shire, it ascends to 180 metres at Capplegill (*Scott Elliot*, Flora, p. 3).

In Switzerland, it occurs at 2580 metres in a little mountain lake in the Sertig Valley, near the sulphur-baths of Clavadel, canton of Graubünden (*Overton* ex Bull. Herb. Boiss. 1901, p. 690). I know of no greater altitude for the species having been recorded, though I have searched through several geographical plant-lists.

Forma FILICAULIS *Rouy et Fouc.* Fl. de France, i. 69 (1893). Caulis filiformis. Folia 1½–2 cm. Pedunculi filiformes folia paullum excedentes. Flores mediocres, 10 mm. in diam. Petala calyce duplo longiora. Carpella in fructu leviter hispida, breviter apiculata, rostello recurvato.

Hab.—France: dunes of Barneville, in the department of Manche (*Corbière*, but not mentioned in his Nouv. Fl. Normand. of the following year). A slender sea-level form, which may be looked for elsewhere.

Forma DOLICHOPODA.—Pedunculi post anthesin recurvi, valde elongati, usque ad 10 cm. Petala late obovata, haud mox caduca sed fere persistentia, venis 7–9 percursa. Receptaculum fructiferum sat hispidum, ovoideo-globosum, pilis circiter 35.

Syn.—*R dolichopodus* A. Kerner ap. Freyn in Zeitschr. Ferdinand. Tirol. heft 35, p. 266 (1893); Fritsch, Sched. fl. exs. Austr. Hung. viii. 26, n. 2908, cum tab. (1899).

I have seen examples of this form from Reschner lake in the mountain-district of the northern part of Tirol (*Zimmeter*), from Phaleron in Greece (*Heldreich*), from Merdj-Achdar near Damascus (*Gaillardot*, 1856, Reliq. Maille. n. 496), and the drawing of a plant from the river Wandle in Surrey (*J. T. Moggridge*, 1866, in bibl. Kew.). This pretty little drawing labelled "*R. trichophyllus*" exactly agrees with Freyn's figure, a form similar in facies to *R. circinatus*.

Forma NUTANS.—Pedunculi folio æquilongi, basin versus curvati, sursum subrecti, apicem versus attenuati, fructiferi sub calyce reflexi. Flores nutantes.

Hab.—Sicily; near the royal hunting-lodge of Ficuzza, in the province of Palermo (*Todaro* Fl. Sicul. exs. n. 1171).

Forma CARNOSA.—Planta pygmæa. Folia parvula pedunculo æquilonga, laciniis linearibus (non capillaribus) carnosis applanatis, apice tum setulifero tum et sæpius setulo destituto.

Syn.—*Batrachium confervoides* var. *carnosa* J. M. Norman, Fl. Arctic. Norveg. 8 (1893).

Hab.—Norway; in several places in the amt of Finmarken, on the muddy banks of rivers and streams (the northern limit of the species, see above).

Forma NANA *Beauverd* in Bull. Herb. Boiss. 1904, p. 1175.—Planta pygmæa, foliorum laciniis haud carnosis.

Hab.—Switzerland; in the mud of lake Lioson, canton of Vaud, at 1870 metres above sea-level, in the district drained by the Sarine.

Var. 2 TERRESTRIS *Godron in Gren. et Godr.* Fl. de France, i. p. 24. —In locis exsiccatis extra aquam crescens, compactus diminutus cæspitosus dense foliosus sæpius omnino glaber. Caulis 5–10 cm., magis rectus. Folia internodio non breviora, laciniis succulentis fereque cylindricis. Flores minimi, tantum 3 mm. in diam. Stamina 5–10. Carpella demum semper glabra.

Syn.—*R. cæspitosus* Thuill. (1799).

Hab.—Not uncommon in this and other countries. On the muddy edge of a pond near Arborfield, in Berkshire (*G. C. Druce*, 1893); in a nearly dry ditch on calcareous soil near Chorlton, in Staffordshire (*J. Saunders*, 1882, in Herb. Mus. Brit., not mentioned in Mr. Bagnall's *Flora*); Nairn (*Rev. A. Ley*); shingly shore of Lough Owel in West Meath (*Rev. E. S. Marshall*, 1895,

n. 1414, in Herb. Mus. Brit.); margin of a brook between Headcorn and Ashford, in Kent (*J. Stuart Mill*, 1861, in Herb. Kew.). Scattered records in other countries include—Anse in the department of Rhône, France (*Seytre*), Niederkirchen in the Palatinate of Bavaria (*F Schultz*, n. 1203, a plant slightly different from the typical form, in the stipules of the upper leaves being pubescent), Outre-Rhône, in Switzerland (*Thomas*), Jitomir in W. Russia, (*Golde*), on the edge of the salt lake of Ontigola, in Spain (*Lange*).

Forma CREBRIOR.—Foliorum laciniæ omnes lineari-capillaceæ (planta usitata ut supra).

Forma GERMANICA.—Foliorum superiorum laciniæ apicem versus sursum paullum dilatatæ. Pistilla primum pilosa.

Hab.—Westphalia, Brunswick, and perhaps elsewhere (*Werner*).

Iconography of the Species.—Var. 1, f. typica: Fl. Danica, fasc. 40, p. 6. t. 2357 (1843), "*R. aquatilis* var. *phellandrifolia*"; Engl. Botany Suppl. 2968 (1863), drawn from a plant gathered by Borrer in marsh ditches, near Eastbourne (and reproduced in ed. 3); Clavaud, Fl. de la Gironde, p. 24, t. 2, fig. 11, reimpr. in Actes Soc. Linn. Bordeaux, p. 244, t. 10, fig. 11 (1881); Coss. et Germ., Atl. Fl. Paris, t. 2, f. 4 (ed 2, 1882). Var. 1, f. dolichopoda: Fritsch, Sched. Fl. exs. Austr. Hung. viii. 26, n. 2908, cum tab. (1899). Var. 2, Reichb., Ic. Fl. Germ. Helv. iii. 3 (1838), "*R. aquatilis* γ, terrestris homophyllus"; Godron, Essai Monogr. in Mém. Soc. Roy. Nancy, 1839, p. 23, f. 6 (1840), et Fl. de Lorraine, i. p. 15, t. 15 (ed. 1, 1843, ed. 2, 1857, ed. 3, 1861); Coss. et Germ., Atl. Fl. Paris, t. 2, f. 5 (1882).

I am afraid I cannot agree with Mr. F. A. Lees, *Fl. W. Yorkshire* (1888), in his reduction of "*R. Drouetii* auctt. angl." to *R. heterophyllus* var. *Godronii* Gren. forma *Drouetii*. "*Godronii*" is a plant of uncertain status, which best comes under *R. diversifolius* Schrank certainly, but "*Drouetii*" cannot be subordinated to it. He writes: "I constantly find plants of our northern streams and ponds, passing one year unchallenged by 'authorities' as *Drouetii*, developing later into indisputable restricted *heterophyllus*, with fan-like floating leaves and larger blooms. None who have watched the true *trichophyllus* of the brackish stells by the sea in Durham, North Lincoln, and South Essex, through all their stages, could mistake *R. Drouetii* for it." But as Mr. Lees speaks of *R. trichophyllus* with its "very small star-like flower," a somewhat unusual state, I am afraid there is some confusion of forms, at least such as understood by the more critical continental authorities, the more so as he states it is very rare in W. Yorkshire. The first certain record for Kent is a specimen from Beckenham in Herb. Dillen. (see *The Dillenian Herbaria*, 1907, p. 80, by G. C. Druce): the earliest record in Rev. E. S. Marshall's *Fl. of Kent* refers to *R. divaricatus*, not to this species.

Insect visitors to one or both species.—*Parhydra aquila*, *Notiphila riparia*, *Hydrotea dentipes*, and small *Diptera*.

SOME LINCOLNSHIRE RUBI.

By Rev. Augustin Ley, M.A.

In October, 1904, the writer paid a brief visit to Lincoln, and occupied a portion of his time in visiting some of the woods and open lands accessible in short cycle rides from the city, with a view to ascertaining the character of the bramble flora. Everywhere he found an unexpected wealth of forms, which, however, owing to the lateness of his visit (the season, moreover, having been an early one), were in part unrecognizable and altogether unfit for collecting. This year an opportunity occurred of returning to the ground, and he spent a fortnight in the county at the height of the bramble season. The present short paper is the result. It is perhaps justified by the fact that Lincolnshire is to some extent virgin ground, so far as these plants are concerned, only seventeen species (excluding ambiguous names) having been previously recorded, so far as the writer knows. His thanks are due to Rev. W. M. Rogers for much patient investigation and criticism; also for an almost complete list of existing Lincoln records other than the writer's own. In such records the sign ! means that the specimens have been seen by the Rev. W. M. Rogers.

In dealing with so large a county, the following list makes, of course, no pretensions to completeness; it constitutes, in fact, only a first list. Of the two Watsonian vice-counties of South and North Lincoln, the spots visited fell mainly within the latter. The locality chiefly worked in South Lincoln was an extensive woodland near Skellingthorpe, called Old Wood. This is the richest bramble locality known to the writer in the whole county. In North Lincoln various small woods in the neighbourhood of Apley—Newball, Spring Wood, Cock Glades, and College Wood—are rich in interest; as are also the heaths and woods near Market Rasen. Further north the chalk wolds near Caistor and Barnetby are not rich in species; while the beautiful wooded hills lying to the west of Brigg are very poor, so far as brambles are concerned, as are also the heaths near Scotton. Everywhere there was ample evidence from the bramble flora that existing Lincolnshire woods are the remains of the aboriginal woodland of Britain, and are not, like the "spinneys" of some of the midland counties, recent enclosures after the original woodland had been destroyed.

Note.—S. = South; N. = North. B. R. C. = Botanical Record Club. *Lees* = Dr. F. A. Lees. * denotes a new record for the county or vice-county. Where no authority is quoted, the record depends on the writer of this paper; and where no date for such record is given, the record was made in August, 1907.

Rubus idæus L. South and North Lincoln, *Top. Bot.* Abundant throughout.

R. fissus Lindl. *S. Norton Disney, 1904; Old Wood, Skellingthorpe. N. *Lees*, B. R. C. Summary, 1878: Birchholt

and Kewsholt, near Lincoln; Newball Wood, 1904; Lynwode Warren, Market Rasen; woods at the Blackhead Ponds, Scawby. The most abundant of the *Suberecti* throughout the county. The usual plant is the form with cordate-acuminate terminal leaflet, large flowers and fruit; but the typical plant also occurs.

R. suberectus And. Rather rare. S. *Herb. Mus. Brit.*! Old Wood, Skellingthorpe, *Fowler & Lees*, B. R. C., 1878. N. Broughton Wood, *Fowler*, B. R. C., 1879; Birchholt, near Lincoln.

*R. *plicatus* W. & N. S. Old Wood, Skellingthorpe, 1904. N. College Wood, Apley. — Var. **hemistemon* (P. J. Muell?). S. Old Wood, Skellingthorpe. N. Stainton Wood. Not always distinguishable from the type by any very definite line.

A very curious hybrid, apparently *plicatus* × *Selmeri*, occurred in College Wood bearing large panicles of minute flowers in which the petals were very minute, nearly black, strongly ciliate; stamens 0; styles black.

*R. *affinis* W. & N. Exclude *R. affinis, Lees*, B. R. C. Summary, 1878. Rare; seen only in a single station. N. Birchholt, near Lincoln, 1904, 1907.

R. carpinifolius W. & N. Rather rare, and only seen in single bushes. *S. Old Wood, Skellingthorpe; one bush in the western hedge. N. *Lees*, B. R. C. Summary, 1878. The right plant? Near Market Rasen; one bush in a hedge. College and Great West Woods, Apley; single bushes.

R. Lindleianus Lees. S. Lane at Swinderby, *Fowler & Lees*, B. R. C., 1878, *Herb. Mus. Brit.*! Old Wood, Skellingthorpe, abundantly. N. Near Osgodby, *Lees*, *Herb. Mus. Brit.*! Stainton Wood; Wrawby Moor; Twigmoor Woods. Abundant throughout.

*R. *argenteus* W. & N. Rare; once seen. S. Roadside near Doddington.

R. rhammifolius W. & N. Rare? N. *Lees*, B. R. C. Summary, 1878; Nettleton and Moortown, near Caistor.

*R. *Scheutzii* Lindeb. Rare; once seen. N. Newball Wood, 1904.

R. pulcherrimus Neum. *S. Swinderby and Stapleford, 1904; Old Wood, Skellingthorpe. N. Usselby, *Lees*! Birchholt and other stations near Lincoln; Wrawby Moor; Twigmoor Woods, &c. Rather common throughout.

R. Lindebergii P. J. Muell. S. Old Wood, Skellingthorpe, 1904, 1907. N. College Wood, Apley. Local.

*R. *mercicus* Bag. Locally abundant. S. Old Wood, Skellingthorpe. N. North Wood, Market Rasen; Stainton Wood, Cock Glades, and College Wood, Apley; in all these stations abundantly. An interesting extension of this rare species.—Subsp. **bracteatus* Bag. More abundant and widely spread than the type. S. Stapleford Moor, 1904; hedges near Doddington and Skellingthorpe villages; Old Wood. N. Hedges near Market Rasen; College and Round Woods, Apley.

R. Selmeri Lindeb. The most abundant and characteristic bramble of all these parts of Lincolnshire, both in south and

north. Scotton Common; a form resembling the type in miniature. Probably the "*R. affinis* W. & N." recorded by *Lees*, B. R. C. Summary, 1878, is this plant.

R. villicaulis Koehl. subsp. *calvatus* Blox. Rare. N. *Lees*, B. R. C. Summary, 1878. Stainton Wood; once seen. — Subsp. **rhombifolius* W. Not common. S. Old Wood, Skellingthorpe. N. Great West Wood, Apley.

R. **gratus* Focke. Local? N. Hedges near Market Rasen.

R. **thyrsoideus* Wimm. Rare. S. "On the Fossway, six and a half miles south of Lincoln," *Fisher*! N. Wrawby Moor, abundantly; a form with the narrow leaves of *R. candicans* W., but not its panicle.

R. **rusticanus* Merc. S. and N. Fairly common throughout, but far less abundant than in more southern counties.

R. **silvaticus* W. & N. Rather common. S. Stapleford and Norton Disney, 1904; Old Wood, Skellingthorpe. N. Newball Wood, 1904; Cock Glades and Spring Wood, Apley; a form bearing a few acicles and glands on the stem.

R. **macrophyllus* W. & N. Rare. Typical plant not seen. S. Old Wood, Skellingthorpe. N. Stainton Wood. "*R. macrophyllus*, south and north," *Lees*, B. R. C. Summary, 1878, is probably *R. umbrosus* Auct. = *R. pulcherrimus* Neum. — Subsp. **Schlechtendalii* (W.). Not common. S. Old Wood, Skellingthorpe, 1904. N. Short Wood, Apley.

R. **pyramidalis* Kalt. Rare; once seen. N. Newball Wood, 1904.

R. leucostachys Schleich. Not abundant. S. Norton Wood, *Fowler & Lees*, B. R. C., 1878! N. Nettleton Glen, *Lees*, B. R. C.; Hubbard's Valley, Langworth! Lynwode and North Wood, Market Rasen.

R. mucronatus Blox. Rare. *S. Old Wood, Skellingthorpe. N. *Lees*, B. R. C. Summary, 1878 ("*mucronulatus*").

R. **Drejeri* G. Jensen. Very rare. S. North Scarle, 1893, *Fisher*!

R. **radula* W. Generally distributed. S. Old Wood, Skellingthorpe, 1904, 1907. N. Kewsholt, Lincoln; Stainton and College Woods, Apley. — Subsp. **echinatoides* Rog. Local. S. Abundant throughout Old Wood, Skellingthorpe. N. Open waste near Scunthorpe; a form.

R. **echinatus* Lindl. Rather rare. S. Old Wood, Skellingthorpe, 1904, 1907; Woolsthorpe, *Fisher*, 1906. N. Wood near Market Rasen; Twigmoor Woods.

R. **podophyllus* P. J. Muell. Local. S. Stapleford Wood, 1904. N. Woods and plantations near Grasby, Limber, and Barnetby, in abundance.

R. rosaceus W. & N. var. **hystrix* (W. & N.). Woods, frequent. S. Hartsholme, near Doddington, 1904; Old Wood, Skellingthorpe. N. Birchholt and Kewsholt, near Lincoln; College Wood and many other woods in this district. — Subsp. **infecundus* Rog. Woods, rather common. S. Old Wood, Skellingthorpe. N. College Wood, Apley, and other woods in this neighbourhood.

R. Kœhleri W. & N. subsp. **dasyphyllus* Rog. Generally distributed, but not abundant. S. Old Wood, Skellingthorpe, 1904, 1907; Woolsthorpe, *Fisher*, 1906. N. Woods on the chalk near Limber; Twigmoor Woods near Brigg, &c.

R. dumetorum W. & N. As a group of forms remarkably rare in all these parts of the county. The following are the only segregates seen: Var. **raduliformis* Ley. Local. S. Hedge near Skellingthorpe village. N. Woods and hedges at Barnetby and Grasby; Elsham Carrs Wood.—Var. **diversifolius* (Lindl.). Rare and poorly developed. N. Newball Wood, 1904; Great West Wood, Apley.

R. corylifolius Sm. Very abundant as an aggregate species, and not always easy to discriminate from *R. cæsius* L. The following segregates were observed: Var. **sublustris* (Lees). Rather rare, but well-marked. S. Old Wood, Skellingthorpe, 1904, 1907. N. Birchholt, near Lincoln, 1904; Barnetby; Elsham Carrs Wood.—Var. **cyclophyllus* (Lindeb.). Rather common, but not well-marked. S. and N.

R. Balfourianus Blox. Local. N. Near Market Rasen, *Fowler*, B. R. C., 1879; woods near Grasby and Limber, on the chalk, very abundantly; plantation edge, Barnetby.

R. cæsius L. S. Bourne Wood, *Fowler*, B. R. C., 1879. N. Broughton Wood, *Fowler*, B. R. C., 1878. Very abundant throughout the county.

R. saxatilis L. Very rare. N. Wood near Gainsborough, *Lees*, B. R. C., 1873; C. C. B.

A NEW *TURRÆA* FROM UGANDA.

By A. G. Bagshawe, M.B., F.L.S., and E. G. Baker, F.L.S.

Turræa vogelioides, sp. nov. Frutex ramulis tenuiter pubescentibus cortice flavo-griseo instructis; foliis breviuscule petiolatis lamina papyracea oblonga vel elliptica vel rarissime anguste obovato-oblonga apice acuminata apice ipso obtusa basi cuneata utrinque glabra subtus pallidiora nerviis primariis sæpissime 5–7 subobscuris arcuatim adscendentibus; pedunculis in axillis foliorum superiorum apice umbellam ferant in specimine nostro 3-floram; calyce cupuliformi tomentello dentibus acutis triangularibus; petalis lineari-oblanceolatis basi longe angustatis extus in sicco tomentellis in vivo intus albidis; tubo stamineo quam petalis breviori intus infra apicem pilosulo basin versus glabro laciniis nullis, antheris ad apicem tubi positis connectivo in apiculam uncinato-inflexam producto, stylo tenui, stigmate crasso fusiformi, ovario 5-loculari, capsula 5-loculari, seminibus nigris arillo croceo munitis. Species adspectu *T. Vogelii* Hook. fil. affinis differt staminibus in margine tubi staminei in ejus dentibus sessilibus, laciniis nullis, ovariis 5-locularibus.

Hab. Durro Forest, Toro, alt. 4000 ft., *Bagshawe*, no. 1042! Crater Lake, Toro, *Mrs. Herbert Tufnell*! Herb. Mus. Brit.

Frutex ± 2 m. attingens vel altior. Folia 9·0–11·0 cm. longa, 3·25–4·25 cm. lata, petiolus ± 4 mm. longus. Calyx ± 2·5 mm. longus. Petala 16–17 mm. long., 4–5 mm. lata. Tubus stamineus 12–13 mm. Antheræ 2 mm. longæ. Stylus ± 15 mm. longus cum stigmate. Stigma 3·0–3·5 mm. longum. Semina ± 6 mm. longa, 2·5–3·0 mm. lata.

This plant, although allied to *T. Vogelii*, cannot be placed in the section *Euturræa*, because the anthers are situated on the margin of the tube. In the original description of *T. Vogelii*, Hook. fil. Niger Fl. 253, the anthers are described as marginal, therefore it seems doubtful whether this species has been correctly placed.

A specimen collected by Mr. Dawe in Ankole, no. 489, may have to be referred here.

In the field this plant was readily distinguished from *T. Vogelii*, which was also collected, the shape, consistency, and colour of the petals being different.

SHORT NOTES.

Fumaria occidentalis: a Correction.—In my article on *Euphrasia Vigursii* (Journ. Bot. 1907, 219), I stated that the new plant therein described was named after my friend Dr. Vigurs, "to whom, *inter alia*, we are indebted for the discovery of *Fumaria occidentalis* Pugsley." That statement was made in perfect good faith, but further study of the history of this handsome Fumitory has shown me that in so writing I unwittingly did a great injustice to my friend Mr. H. W. Pugsley. Briefly stated, the facts are these: In 1898 Dr. Vigurs became aware of the existence of a Fumitory in the Newquay district which did not appear to him to fall under any described British form, and specimens were forwarded to Mr. G. C. Druce, who in turn sent them on to Herr Freyn (see Bot. Exchange Club Report, 1904, 4); but beyond that nothing appears to have been done. In June, 1902, when on a tour in West Cornwall, in company with Mr. E. G. Baker, Mr. Pugsley found what afterwards proved to be the same plant at Penzance and at Helston, and, to quote from a letter of his to me, "we both realized on the spot that we saw a species new to Britain." Early the next year Mr. Pugsley, whose original work on Capreolate Fumitories is too well known and appreciated to need an encomium here, commenced a long and painstaking series of investigations in connection with the stranger, and in 1904 he described and figured it in this Journal as a new species, under the name *Fumaria occidentalis*. To Dr. Vigurs it is but fair to state that he himself has never claimed to have "discovered" the plant. I believe I was the first to associate his name with the discovery, but, as I have already stated, my remarks were based on a misapprehension.—F. Hamilton Davey.

Alien Plants near London.—In Journ. Bot. 1906, 396, I published a note under this heading. My friend Mr. Raine, of Hyères, has asked me to give a list of certain interesting plants he found last August, on waste ground in the south of London, of all of which specimens have been seen by me, viz.:—*Linum angustifolium* Huds., Sydenham; *L. perenne* L. and *Salvia verticillata* L., waste ground near Norbury—*Linum perenne* is apparently not found in France or Switzerland; *Sisymbrium pannonicum* Jacq. and *Saponaria Vaccaria* L., near Crown Hill; *Reseda alba* L., near Streatham Common; *Hieracium Pilosella* L. var. *tardans* H. & P., roadside near Eliot Bank; *Ornithopus sativus* Brot. *pro parte* = *O. roseus* Dufour, *Vicia peregrina* L., *V. varia* Host, *Caucalis daucoides* L. and *Valerianella coronata* DC., waste ground near Sydenham. I am not aware that *V. coronata* has been found in England before, and it is difficult to account for its appearance at Sydenham; the specimens were in good fruiting condition and are identical with those at l'Herbier Boissier near Geneva — H. S. Thompson.

Leptodontium gemmascens Braithw. in Herts.—On. Nov. 30th last I saw this rare Moss on the decaying thatch of an old summer-house in the grounds of Mr. H. Clinton Baker, at Bayfordbury, Herts. It was associated with two common species, *Dicranoweisia cirrata* and *Ceratodon*, and hardly distinguishable from them except by the gemmiform leaves. The gemmæ were just visible to the naked eye on close observation. This species has now been seen in South Devon, East and West Sussex, West Kent, Surrey, Herts, Mid-west York, and Forfar, but has not yet been recorded from any locality outside Britain.—A. B. Jackson.

Rosa pomifera J. Herrm. as British.—I have recently revisited the station at which I discovered this Rose in the Black Mountain group in Brecon in 1876, and found it again at the same station, and at fresh ones on Taren r'Esgob, Breconshire, and on the Red Daren, Herefordshire. I find also a specimen of the same Rose among gatherings of my own on the limestone scaurs of Ingleborough, West Yorks, in 1902, which at the time I could not name. The last-named specimen shows the characteristic *ciliate petals* which mark this Rose from its congeners. It will probably be found in other mountain districts; but it must be remembered that the native form does not exhibit the size and luxuriance of leaf and fruit exhibited in the garden form: hence probably it has remained unrecognized.—Augustin Ley.

Salix herbacea L. in Carmarthenshire. — While plant-hunting in company with Rev. C. H. Binstead and the late lamented Rev. W. R. Linton on the Carmarthenshire hills in July, 1906, I had the good fortune to come across this alpine species on one of the higher points of the cliff called "Y fau sirgaer" in fair quantity. Mr. H. H. Knight, of Llandovery, informs me that he subsequently found it at a second station on this precipice.—Augustin Ley.

RUBUS MUTABILIS Genev. var. NALDRETTI mihi (see p. 24).—The concurrence of Mr. Moyle Rogers in my view as to the distinctness of this plant as a variety worthy of name induces me to record more definitely its claims to that position. If the somewhat doubtfully expressed note in the Report of the Watson Club (quoted in the last number of this Journal, p. 24) be inadequate to stand as publication, the present note will suffice for that purpose. JAMES W. WHITE.

POTAMOGETON PENSYLVANICUS Willd. IN ENGLAND.—In *The Naturalist* for January Mr. Arthur Bennett records this North American species from the canal at Salterhebble Bridge, near Halifax, where it was found last year by Miss A. E. Vigurs, just where the effluent from a cotton-mill enters the canal. This is "the first authenticated example of a *Potamogeton* being introduced" known to Mr. Bennett.

THE FLORA OF SURREY.—When I took over the work of compiling a new Flora of Surrey, announced in this Journal for 1884, I little thought that twenty-three years would elapse and the Flora still remain unpublished. At the time of taking it over I had practically no knowledge of what was entailed by such an undertaking, and while I have found myself quite able to cope with the out-door work, I have been equally unable to find either time or opportunity to attend to the literary work, especially in the case of a metropolitan county for which the records are so innumerable. With regard to the out-door work, I believe that the county has probably been about as fully investigated as any whose Flora has been written; the working out of the distribution of the various species throughout all the districts has always been the prime object; such rarities or novelties as have been found have nearly always been discovered as the consequence of the system followed, which must necessarily disclose occasionally oases of rare plants which would probably be missed altogether if merely the "likely" spots were examined. With regard to the book-work the reverse is the case, and very little has been done, and I have long felt that there was no probability of the Flora ever being completed by me. Under these circumstances, it is with very great pleasure that I am able to announce that Mr. C. E. Salmon has undertaken the work of completion. From what has been said above concerning the book-work, it will readily be understood that the task which Mr. Salmon has kindly undertaken is no sinecure. While thanking my many friends and correspondents for all their varied assistance in the past, it only remains for me to bespeak for Mr. Salmon the help of all botanists who have any information to impart concerning Surrey botany, and to ask that all communications relating to the subject may in future be sent to him at Pilgrims' Way, Reigate.—W. H. BEEBY.

WE greatly regret to announce the death, on Jan. 4, of the Rev. W. R. Linton, of whom a notice will appear in our next issue.

NOTICES OF BOOKS.

Handbuch der Systematischen Botanik. Von Dr. Richard R. v. Wettstein. Bd. ii., Th. 2. 8vo. pp. 161–394, mit 995 fig. in 165 Textabbildung. Leipzig u. Wien: Deuticke. 1907. Pr. 9. Mk.

The present instalment of Professor Wettstein's text-book contains the first part of the account of the Angiosperms. About thirty pages are given to a section on General Morphology; reference to general text-books is suggested for vegetative structure, but some account is given of the arrangement of the parts of the flower as indicated by floral diagrams and of the stamen, pollen, ovule, passage of the pollen-tube, fertilization and the development of the embryo and seed; there are also some excellent figures borrowed from well-known sources. The author then briefly discusses the phylogeny of angiosperms. The many and striking points of resemblance between the two great groups, Monocotyledons and Dicotyledons, especially in the structure of the flower and of the sexual organs and in the method of fertilization, forbid the assumption of a separate origin in the two cases. As regards the inter-relation of the groups, whereas the derivation of Dicotyledons from Monocotyledons seems inconceivable, there are no prime difficulties in the assumption that the Monocotyledons have sprung from the Dicotyledons, granting that the separation was a very early one; reference is made to the often-quoted resemblances between the Monocotyledons and some members of the series *Polycarpicæ* of Dicotyledons. We cannot, however, agree with Dr. Wettstein's statement on p. 196 (first paragraph), when he supports his argument as to the secondary position of Monocotyledons with the statement that the group contains no types which show marks of great primitiveness. "Primitive" is a much-abused word, but surely the structure and arrangement of the flowers in *Pandanales* strongly suggest a primitive one, whatever view we may take as to the position of the *Helobieæ*.

The author accepts the two great subclasses of Dicotyledons now generally recognized, an earlier one—*Choripetalæ*, and an obviously later one, whether mono- or poly-phyletic, *Sympetalæ*. In the attempt to arrange the series of *Choripetalæ* as far as possible in a genetic series, the author emphasises the importance of determining what are the more ancient characters, that is to say, those which indicate a morphological approach to the Gymnosperms—for even those who regard present-day Gymnosperms as derivative forms will admit that it is in that division that we must seek the transitional stage between Pteridophytes and Angiosperms. Such characters are the following: a woody habit, absence of wood-vessels in the bundles, unisexual flowers, absence or simplicity of perianth, anemophily, endotropic growth of the pollen-tube, and a relatively long interval between pollination and fertilization. It is among the monochlamydeous series of *Choripetalæ* that such characters are found, and these are regarded as representing the more primitive types of the subclass. The

second set, *Dialypetalæ*, is headed by the series *Polycarpicæ*, which are better regarded as representing the origin of the set which is characterized by hermaphrodite flowers with a well-developed corolla than as the stock from which the whole subclass *Choripetalæ*, and consequently the whole great class of Dicotyledons, has been derived. The author admits a relation between this series and the Monocotyledons, and brings forward the supposed absence of primitive types in this class in support of the relatively advanced position among the dicotyledonous series which is assigned to the *Polycarpicæ*. He denies, moreover, that this series can be derived directly from the Gymnosperms. A further argument in favour of regarding the *Monochlamydeæ* as the most primitive Dicotyledons is the relatively large proportion which they form of the dicotyledonous flora at its first appearance in cretaceous times—according to Bessey's reckoning they include 61 to 64 per cent. of the whole as compared with 15 per cent. at the present day.

The author then traces the evolution of the typical porogamic pollen-tube growth in Angiosperms from the primitive method in Cycads where the tube is not directly concerned with the transport of the male nucleus; the chalazogamic stage in *Casuarina* and certain amentiferous genera is regarded as an intermediate one. Finally, an attempt is made to derive the angiospermous flower from that of the Gymnosperms. The simple unisexual flower of the *Monochlamydeæ* is assumed to have been derived from an inflorescence—thus the whorl of male flowers in *Casuarina* recalls on the one hand the arrangement of the small flowers in *Ephedra*, while on the other hand it is suggested that it has given rise to a simple monochlamydeous staminate flower, the bracts becoming the perianth and the axillary unistaminate flowers becoming the stamens. This looks simple when viewed as a floral diagram, but does the author sufficiently appreciate the wide morphological difference between the whorl of axillary staminate flowers of *Casuarina* and the simple eucyclic flower which he derives from it? The pistillate flower is derived from a union of a pair of carpels and the development of the hermaphrodite flower is foreshadowed in such an inflorescence as occurs, *e. g.*, in *Euphorbia*, where a simple female flower is surrounded by male flowers.

The greater part of the book is, of course, devoted to the systematic treatment of the series and families, which is on the lines familiar to us in the German systems which have grown out of that of Eichler. The subject-matter, which is severely systematic, is illustrated by a large number of excellent figures, some of which are original, while others are borrowed, with due acknowledgement, from familiar sources. The series *Centrospermæ* is placed at the end of the *Monochlamydeæ*, and the author traces within it the development of the dichlamydeous from the monochlamydeous flower, the corolla being regarded as derived from a second whorl of stamens. The *Cactaceæ* are regarded as representing an extreme development of this series, through the *Aizoaceæ*.

A. B. R.

Der Lichtgenuss der Pflanzen. By Prof. J. Wiesner. Pp. 322, with 25 Illustrations. Leipzig: Engelmann. 1907.

For many years practical men have paid more attention than botanists to the effect of light upon the whole life of a plant. The horticulturist has long recognized that certain plants thrive best in shady spots, while others flourish only in well-lighted situations. Foresters, too, have classified trees into "light-demanding," "shade-enduring" (and even "shade-demanding") species, and have appreciated the fact that in different places the amount of light required by a species varies. Furthermore, gardeners have practically appreciated that it is often necessary to grow tropical plants at higher temperatures in greenhouses than in the tropics, presumably because in the former the light is weaker than in the latter. Yet in none of these cases have we been justified in assuming that the matter is purely one of illumination, for it is obvious that with variations in the intensity and duration of light there are concomitant ones in temperature, humidity, and other external conditions. To the disentangling of this complex of conditions Professor Wiesner has made a notable contribution by initiating a line of quantitative research, the object of which is to ascertain the actual amount of light received by various plants and habitats. But he himself would probably be the first to admit that the extent to which light, as such, is responsible for the results obtained will involve much further research.

Prof. Wiesner employs photo-chemical methods of measuring light. The intensity of the light falling upon a plant (or plant-member) he terms its "Lichtgenuss," which literally means the amount of light "enjoyed" or received (not "used") by a plant. For this German word the English equivalent "photic ration" was proposed, and since then Wiesner has suggested the term "photolepsy." He distinguished between *relative* photolepsy—by which he means that fraction of the full intensity of daylight which is falling upon a plant—and *absolute* photolepsy—by which he means its absolute intensity. By means of actual measurements the vague terms "sunplant," "shade-plant," and the like, are thus replaced by statistical information.

Sections of the work under review are devoted to photometric methods; natural daylight prevailing in one place at different times, in places of different habitat, latitude, and longitude; a general account of the illumination of plants; photolepsy in relation to species, habit, habitat, age of plant, altitude, latitude, defoliation, and to mycorhiza; the precise tint of green of leaves; a physiological analysis of photolepsy; photometry in relation to agriculture and forestry.

With the enormous output of new literature, botanical science will be increasingly dependent upon the issue of authoritative works of this kind. It is free from the excessive length and wearisome redundancy that are so unfortunate a feature of much modern German botanical literature.

Percy Groom.

WARMING-JOHANNSEN, *Lehrbuch der allgemeinen Botanik*. Herausgegeben von E. P. MEINECKE. Erster Teil. 8vo. Pp. 480, tt. 444. Borntraeger, Berlin, 1907.

THIS is a German translation of the Danish text-book of botany, the fourth edition of which was published in 1901. Some delay has arisen in the issue of the work, the printing of which began in 1904; the first part now to hand comprises three-fourths of the whole, and the remainder is promised at once. It is to be hoped that there will be no further delay in the completion of the work, which at present breaks off in the middle of a chapter and lacks the very necessary index. When completed it promises to be quite one of the best of the recent text-books on general botany. In point of size the book will be larger than the well-known and widely used Strasburger *Lehrbuch der Botanik*, but the Warming-Johannsen work corresponds only to about half of the other book; that is to say, to the general portion as distinguished from the special treatment of the great divisions of the plant-world. Hence in the newer work we have a much more exhaustive treatment of general morphology, cell-structure, general anatomy and physiology than was presented in the Bonn text-book edited by Dr. Strasburger. The treatment is clear, the illustrations are numerous and helpful, and the book should prove of great value to students who need a somewhat fuller exposition of the facts of general botany. Of the twelve sections into which the subject-matter falls, the first portion includes numbers 1 to 7 and part of section 8, that is to say, the general morphology, cell-structure, anatomy and physiology, leaving for the second portion the remainder of the section on reproduction, and sections dealing respectively with inflorescence, flower, and pollination, fruit, seed, and germination, an ecological chapter, and one on phylogeny.

A. B. R.

BOOK-NOTES, NEWS, &c.

AT the meeting of the Linnean Society on 19th December, a paper by Dr. G. Archdall Reid "On Mendelism and Sex" was read, of which the following is an abstract:—Species are adaptional forms which have arisen under the operation of Natural Selection. The evidence is plain that, speaking generally, variability is controlled and regulated by Natural Selection; therefore variability itself is, in a real sense, an adaptation. Nearly all variations are spontaneous, as is proved by a mass of evidence afforded by human beings; Natural Selection builds solely on spontaneous variations. When selection ceases as regards any character, that character tends to retrogress; therefore retrogressive variations tend to predominate over progressive variations. This tendency to retrogression is very useful and has played an immense part in adapting species to their environments. The author then touched upon blended and alternative inheritance; fluctuations and mutations; differences between Artificial and Natural Selection; and differences in the mode of reproduction of sexual and non-sexual

characters. The mode of reproduction of mutation tends to resemble that of sexual characters; when conjugation occurs there is an appearance of alternative inheritance as regards both sexual characters and mutations, but it is an appearance only. The evidence is plain that there is only alternative reproduction combined with latency of one alternative and patency of the other, and actual blending between the patent character of one individual and the latent character of the other, therefore blending is universal. This tendency, owing to the predominance and prepotency of retrogressive characters, tends to cause retrogression on cessation of selection, and this is the function of sex.

Mr. A. B. Jackson contributes to the Proceedings of the Hampshire Field Club a paper on the Moss Flora of Hampshire and the Isle of Wight. Mr. Jackson considers that a good deal remains to be done before the Moss Flora can be regarded as thoroughly worked out, and observes that the New Forest, although a favourite ground for students of flowering plants, has never been systematically explored for mosses and hepatics. In the list given all previous records, including those of Mr. Dixon in this Journal for 1898, are included, and numerous additions are made. The number now recorded for the county is over 270.

The last number of the *Icones Plantarum* contains as usual a large number of interesting novelties, mostly from China. Mr. Hemsley is, as usual, the principal contributor; he describes as a new genus, *Sinofranchetia* (Lardizabalaceæ), a plant formerly referred to *Holboellia*, and figures and describes seven species (four new) of *Stauntonia*. It might perhaps have been mentioned under *S. chinensis* DC. (which dates from Syst. i. 514 (1818) not from Prodr. i. 96 (1824)) that the type was collected by Staunton and Macartney, whose specimens, as is frequently the case, are not definitely localized. Among Mr. Hemsley's other interesting new species are *Sciaphila Clemensæ*, *Altingia gracilipes*, four species of *Sycopsis*, and *Sabia gracilis*; *Cordeauxia edulis* Hemsl. and *Peglera capensis* Bolus are figured and fully described.

It is most satisfactory to find that, though only four years have elapsed since the publication of Dr. Jost's Physiology (*Vorlesungen uber Pflanzen Physiologie*. Jena: Fischer), a second edition is already required. The new edition is similar to the old in size and general arrangement of contents; the only noteworthy change in the mode of subdivision of the subject consists in the linking together of "Stoff-und Energie-wechsel" in one (the first) part; and in describing movements — tropistic, nastic, &c. — under the not altogether happy title of "Orts-wechsel." The text has been carefully and critically revised, and accounts of the more fundamental recent researches—*e. g.*, those of the Cambridge physiologists on Carbon-Assimilation—are added. The relegation of the lists of authors cited to the end of the volume is in our opinion a mistake, and we would suggest that in the third edition these lists should be once again placed at the ends of the chapters, and that, in addition, an alphabetical index of authors with subjects should be the general index.—F. K.

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THE LATE REV. W. R. LINTON.

(WITH PORTRAIT.)

William Richardson Linton, who died at Shirley Vicarage on the 4th of January last, was born on the 2nd of April, 1850, at Diddington Vicarage, Hunts. He was the fifth son of the late Canon Linton, of Oxford and of Stirtloe House, Huntingdon, and named after his maternal grandfather, William Richardson, formerly vicar of Ferrybridge, Yorks. He was educated at Repton School, then under Dr. Pears, and rose to a high place in the sixth form. At Corpus Christi College, Oxford, which he entered in the October term, 1869, he gave himself mainly to classical studies, in which he had been well grounded at school. His diversions were kept within moderate bounds—on the river, where he won cups in 1870 and 1871 in the College Challenge Fours; on the running ground, where more than one prize for long-distance races fell to his share, and in the fives-court, a game at which he excelled. In the schools his devotion to work was rewarded with a Second Class in Moderations, a Second Class in the Final Classical School, and again a Second Class in the newly established School of Theology. These honours were followed by his carrying off the Denyer and Johnson Theological Scholarship in 1875, and subsequently the Hall and Houghton Senior Septuagint prize. In the study of Hebrew, taken up for two of these later examinations, he became, through long years of continued application, as proficient a scholar as in Greek or Latin.

So far Linton had taken no great interest in botany beyond accompanying his brother or the Rev. H. E. Fox (now Prebendary Fox) in rambles near Oxford or on holiday trips, and joining in their search for plants. In Natural Science his first interest was in geology, aroused by a long summer holiday spent at Whitby, and maintained in visits to the numerous oolite quarries around Oxford. A prize offered at school led to a collection of land and freshwater shells, which was continued for years, and added to in foreign travel.

In 1874 Linton was ordained by the Bishop of London to the curacy of St. Paul's, Upper Holloway, of which the Rev. F. J. Chavasse (now Bishop of Liverpool) was the vicar. The intellectual side of clerical life appealed to him more than the pastoral. His strength lay in the study and exposition of Divinity and all Biblical subjects, though in the more practical duties from which he would rather shrink he seems to have left his mark. The Bishop of Liverpool writing lately, after a lapse of thirty years, recalls "his conscientiousness and his high sense of duty. He disliked pastoral visitation, for naturally he was shy and reserved, though no man had a warmer heart and deeper sympathy. But though he disliked it he regularly paid his round of visits. . . . Never had a man a more loyal and faithful colleague. His generosity was unbounded, his self-effacement was continuous, and he won the hearts of the people in the district by his un-

varying kindness and consideration. All his work was characterized by thoroughness and self-devotion, and I am sure that he must often have seriously pinched himself to help the poor and promote the work of the Church. Though disinclined to talk, at times he would open out and show what stores of knowledge he had accumulated. I feel as if I had lost an *alter ego*."

A good part of the summer holidays for several years from 1874 was taken up with expeditions to the Swiss Alps, for mountaineering rather than botanizing, in company usually with the Rev. A. G. Girdlestone, author of a very entertaining book, *The High Alps without Guides*. A few specimens were snatched by the way, but the companionship was more productive of ascents of peaks and passes and humorous episodes than of natural history results. After two years at his curacy in Holloway, W. R. Linton accepted the post offered him in 1876 as second tutor at the Church Missionary Society's College, Islington, and held it for the next ten years, retaining the curacy in an honorary capacity the whole time, and giving his services for the Sundays to three successive vicars. Part of a letter from the Rev. F. Glanvill, Vicar of St. Matthew's, Bristol, speaks of his work and his influence at the College:—"I had the privilege of being a pupil of the late Rev. W. R. Linton from April, 1877, to Easter, 1880, and shall always be grateful to him for his teaching. His lectures were really and truly models of preparation. His interpretations were always the common-sense ones. He was strongly opposed to reading into a text anything that could not fairly and squarely be deduced from it. At the weekly delivery by a senior man of a lecture or sermon in Hall, his criticisms were just but never unkind; with perfect frankness he would indicate a weak point in an argument, and in private afterwards he would help a man to reconstruct it. Unusually reserved in manner, he would go through a cricket or football match and hardly utter a word more than was necessary, and yet no one was keener on the game." Mr. Glanvill goes on to speak of the real deep sympathy and readiness to help that came out in private conference, and says that as time went on "his popularity with the students was immense."

It was during the ten years at the College that W. R. Linton took to botany in earnest. His duties were so arranged that he could often spend the long summer afternoons in country rambles; all the more promising districts in the home counties that were easily accessible from town were explored in search of flowering plants; and the foundations of a large British herbarium were laid. He joined the Botanical Exchange Club (Distributor and Editor of Report, 1894, 1899, and 1906), and was one of the original members of the Locality Record Club. The love of field botany grew upon him and gradually undermined his affection for mountaineering.

A break for one term in the routine of his life in Islington occurred in 1881. Late in January he and the Rev. A. G. Girdlestone started for Palestine, with the intention of exploring the

country *on foot*, a novel mode of progression at that time for European visitors. The climate made great difficulties for pedestrians, the heat at times almost past endurance, changing rapidly to chilling storms and heavy rains (which sometimes flooded their tent), making the country heavy travelling, and the swollen unbridged torrents impassable for the time on foot. The pluck and endurance of the travellers overcame all trials. Having visited Cairo and the Pyramids on the way out, they explored the whole land from Hebron, Bethlehem, and the Dead Sea in the south to Damascus and Baalbek in the extreme north; they crossed the Jordan and made a circuit in Moab and Bashan; they ascended the snowy peak of Mt. Hermon, and crossed the ranges of Lebanon. All their journeys, and what they observed, were graphically recorded in full diary letters by Linton to his father, which abound in interesting references and identifications, in remarks on natural history and humorous incidents. No one could have been much better prepared to appreciate the topography of the Holy Land. He knew its history critically; had got up a fair amount of Arabic, enough to understand the Arabs they met with; was a keen observer, a listener and a thinker rather than a talker, as these graphic diaries show. He took sketches to illustrate future lectures; shot a few birds, gathered a few land-shells, and collected a large number of specimens of plants to work out at home. The gathering of herbs struck the fancy of the Arabs, who named him the "Father of Cabbages," as they named his companion the "Father of Legs"!

In 1882 Linton bade farewell to the Swiss mountains, and British botany drew him to the Scottish Highlands most of the summers of the next fifteen years. In company with his brother he engaged in the study of *Hieracia* and *Salices* from this time forward, and in the collection of alpine plants generally. Braemar and Glen Shee, Clova and Killin were frequently made their headquarters, and the Moffat Hills, Skye, and the far north of Scotland were visited more than once. From this time onward W. R. Linton largely increased his European herbarium—more rapidly when the "Linnæa" was formed and he became the Director for Britain. His botanical collections are being presented by his widow to the Liverpool University.

In 1885 Ireland was visited for the sake of seeing and getting some of the endemic species, most of which were found, including the rare *Inula salicina* L. (Journ. Bot. 1886, p. 18). One more visit to Ireland was made in 1895, when the time was spent with the late H. C. Levinge, at Knock Drin Castle, in the study of *Rubi*, *Characeæ*, &c.

The year 1886 was an eventful one in Linton's life. He became engaged in October to Miss Alice Shirley, eldest daughter of the late Professor Walter Waddington Shirley, of Oxford, to whom he was married at Oxford in the following January. He resigned his post at the C.M.S. College and his curacy at St. Paul's, Upper Holloway, in the late autumn of the same year; and having accepted the Vicarage of Shirley, near Ashbourne, he made it his

home for the remainder of his life. The previous summer holiday was passed in the extreme north of Scotland, during which he gathered his first new hawkweed, afterwards named by him *H. orcadense*.

From the time of his first settling in Derbyshire the flora of the county became a matter of interest. The country was explored in different directions, and critical or doubtful plants were brought into the garden to be watched. The companionship of the Rev. W. H. Purchas was sought, and much enjoyed. All this paved the way for a project which did not take definite shape till about 1893, the compilation of the *Flora of Derbyshire*. For this purpose some of his summer holidays and occasional short visits were made to all parts of the county, his wife accompanying him at all such times. The experiment was made of dividing the county, not by river-basins but by geological formations; and the book, published in 1903, is a witness to the unwearied diligence and critical ability, both in field-work and in herbarium research, with which he accomplished his task. Finding the mosses had been well worked in some parts of the county, and the hepatics in none, he studied both these classes of plants, to good purpose as the records show. The *Rubi* were attacked in the first place with another object in view, *viz.* the *Set of British Rubi*, which he joined with three others in issuing, and to which he contributed his fair share, adding one new species, *R. durescens*, to the British list. The *Set of British Willows* and the *Set of British Hieracia*, both of which he shared in partnership with his brother, followed in quick succession; the preparation for these had been going on for years, the garden at Shirley being used for growing and observing scores, or even hundreds, of the hybrids of one genus and the critical forms of the other, while experiments were made in hybridization of *Salices*, and in the constancy of various *Hieracia* species by raising crops of seedlings.

The gathering of material for the later fascicles of the last-named Set led him to search the Yorkshire dales, the Lake District, and some of the Welsh hills for hawkweeds, in company with the Rev. A. Ley; and these excursions revealed the existence of many forms not noticed in the British list, and the growing cumbrousness of the huge aggregate species we were so far content to call *H. murorum* L. His last work of importance was to publish an *Account of the British Hieracia*, in which, after much study of Scandinavian treatises on the genus and Scandinavian species, and much correspondence with Aman. H. Dahlstedt, he redistributed the species and varieties of the *Vulgata* section, and produced a masterly handbook on *Hieracia* as they are represented in the British Isles. His generosity of disposition in other respects has been shown also in the liberal sacrifice of time for the benefit of many fellow-botanists, who have found that he would spare no trouble to let them share his knowledge in this perplexing genus. The *Hieracium* list in the new edition of the *London Catalogue* is from his pen; and it is no secret that he had agreed to continue, and was looking forward to carrying out, Mr. F. J. Hanbury's long-interrupted Monograph.

The Rev. Augustin Ley, his frequent companion in recent years, contributes the following sketch :—

"I made acquaintance with W. R. Linton first when staying with the late Rev. W. H. Purchas at Alstonfield in 1887; my earliest walk with him being that in which *Hieracium holophyllum* W. R. Linton was discovered (Journ. Bot. 1890, p. 376). Since then I have been with him in West Yorkshire in 1902. 3, and 4, on expeditions in the course of which we explored successively the neighbourhoods of Ingleton, Horton, Clapham, Kettlewell, and Arncliffe. In 1905 we were together in the English Lakes, and in 1906, for a short time, in West Breconshire; and in addition to these summer rambles, he has paid me numerous visits at my own home. I did not know him in the earlier years, in which he displayed strength and activity beyond the reach of most men; my friendship with him has been in years of impaired health.

"Among my impressions of his character stands first his indomitable perseverance. He undertook, about the year 1893, the *Flora of Derbyshire*, a county in which, though a great deal of sporadic work had been done, large tracts remained botanically unexplored, and carried it through until he published it in 1903. His method was to take farmhouse lodgings in some remote district, and explore systematically its neighbourhood, working steadily on day after day in what may have been an uninteresting district among common plants, arriving in that way at an exhaustive knowledge of the mosses and hepatics, as well as the seed-plants of the county.

"Another feature of his character was his reliance upon science and willingness to follow wherever the facts of Nature appeared to lead, and to publish these facts for the help and guidance of others, undeterred by those possibilities of error which cannot be entirely eliminated, or by doubts how far others would commend or condemn the advance attempted, convinced that what was worth being was worth knowing, and that its publication would lead into fuller truth. He used to speak with admiration of the thorough way in which Scandinavian botanists have named and are still naming and describing their unparalleled wealth of *Hieracium* forms, and to express the opinion that it would be well for British botanists to do likewise.

"This dogged perseverance, joined with confidence in following Nature's lead, made the hawkweeds a group at once peculiarly fitted and calling for his special abilities; and his death will be especially lamented by workers in this group, and by all who wish to see order and knowledge take the place of a chaos of forms. Light, such as has transformed the study of British willows through his labours and those of one or two others, was beginning to illumine the gloom of *Hieracium*; we hope darkness will not now settle down again.

"Among personal traits, his equability of temper, joined with carelessness of personal comfort and of dress and appearance, was very remarkable. Through years of ill-health and suffering I never remember him in any degree irritable or put out. I recollect

an inn in West Yorkshire at which we stayed for six days. The food was coarse and the cooking coarser; William Linton plodded through it without a word of complaint till we left for more comfortable quarters. Then he said, 'I could not have stood that any longer.' He persevered for years upon the dry, uninteresting diet which his complaint demanded without a murmur, and got through much botanical work long after most men would have given up, and when ill-health forbade continuous application of brain or eye.

"He had a great distaste for the trivialities of ordinary society; yet this was joined with real courtesy and a readiness to help others by lectures, &c., on any of the subjects—and they were many—of his special knowledge; and with a fund of informing conversation and amusing anecdote, when one could reach it. The well was deep, but the water at the bottom was abundant and refreshing."

Though prominence has here been given chiefly to Linton's contact with natural science, his power of methodical application to work was equally shown in the attention given to other duties. He was a seeker after truth in more directions than one, not one to bend truth to his views. His wife long ago was asked by a friend what his views were. "Not labelled," was her reply, and the retort much pleased him. His views were very clear, founded on sound scholarship and wide reading, but they were not those of a party. Another friend, his fellow-tutor at the College from 1880, the Rev. S. Dyson, who spent each Easter with him at Shirley, writes of him as "the dearest and truest friend I ever had. Reserved in mixed society, he was the most delightful companion possible among intimate friends." Dr. Dyson recalls the great interest of a country walk with him, and the delight of his talk over plants or birds or the geological formation of the country round. He goes on:—"He was also deeply read in those studies which belong to the clerical profession. It goes without saying that he was familiar with his Greek Testament and had read the latest and best Commentaries on its varied contents. He was also a very learned Hebraist. In the course of my annual visits to Shirley we read through the major part of the Hebrew Bible. . . . Several years ago he was led to accept many of the conclusions of the Higher Criticism with regard to the authorship, &c., of the Hebrew records. Continued study, however, compelled him to modify his views, and he gave his revised and amended judgment in two noteworthy articles in the *Churchman* (February and March, 1906) on 'The Deuteronomic Legislation and its Relation to the Priestly Legislation,' which brought him many letters of congratulatory thanks."

In Shirley, the death of their vicar came as a great shock to the parishioners, as it did indeed to a much larger circle, fellow-botanists and others. He had been out of health for some few years, and his former activity was much impeded by his complaint, but his health last year appeared to be improving, and on the rocks near Moffat in the summer he felt all his old nerve. During his twenty-one years' ministry he had gained the affection and

respect of the parish, and the scene at the funeral was most touching. "Almost every family in the parish," the local chronicler says, "was represented in the crowd assembled in the churchyard. As the parishioners gathered round the grave to take a last look at the coffin, the one remark heard on all sides was, 'We shall never see his like again.'"

E. F. L.

ALABASTRA DIVERSA.—Part XVI.

By Spencer le M. Moore, B.Sc., F.L.S.

New or Rare African Plants.

(Continued from p. 44.)

Solanaceæ.

Lycium Eenii, sp. nov. Ramis angulatis glabris albo-corticatis namulos breves patentes foliosos gignente, foliis sessilibus vel brevissime petiolatis ovatis vel ovato-oblongis apice leviter cuspidulatis ipso acutis basi sensim angustatis longe decurrentibus crassiusculis glabris, floribus 5-meris ex axillis ramulorum oriundis eosve terminantibus subsessilibus, calyce tubuloso-campanulato glabro lobis quam tubus brevioribus lanceolatis acutiusculis sub fructu (calyce irregulariter rupto) inæqualibus, corollæ tubo calycem plus quam duplo superante sursum levissime ampliato lobis 5 rotundato-ovatis obtusis tubo manifeste brevioribus, staminibus subinclusis, bacca calyce leviter accrescente circumdata ovoidea glabra pericarpio carnosulo, seminibus numerosis.

Hab. Damaraland; *T. G. Een.*

Folia solemniter 1·0–2·0 cm. long., 0·6–1·2 cm. lat., costa centrali lata, in sicco lutescenti-viridia; petioli dum adsint 0·2 cm. long. nunquam attingentes. Pedunculi crassiusculi, summum 0·25 cm. long. Calyx sub flore circa 0·4 cm. long.; hujus lobi 0·15 cm.; sub fructu 0·55 cm. long. Corollæ tubus 1·0 cm. long., ima basi 0·2 cm., faucibus 0·5 cm. diam.; lobi circa 0·2 cm. long. Bacca 0·6 × 0·45 cm. Semina 0·2 × 0·175 cm.

Recognized at sight from the other Tropical African species by the broad leaves and sessile or subsessile flowers.

Scrophulariaceæ.

Stemodiopsis Eylesii, sp. nov. Suffruticosa, sat prolixa, ramulis gracilibus sæpe decumbentibus minute pubescentibus, foliis parvulis spathulato-ovatis obtusis integris raro obscure denticulatis in petiolum comparate longum desinentibus utrobique minute pubescentibus, floribus in axillis solitariis pedicellis a foliis superatis juxta medium bibracteolatis suffultis, calycis minute pubescentis lobis lineari-lanceolatis acuminatis, corollæ extus puberulæ tubo calycem fere duplo excedente labio postico oblongo-obovato 2-lobo antico posticum æquante palato intruso induto, staminum anticorum filamentis haud tortis, staminodio filiformi capsula breviter rostrata decurva puberula.

Hab. Mazoe, Rhodesia, Iron-mask Hill: *F. Eyles,* 252.

Foliorum limbus 0·5–1·0 cm. long., 0·3–0·5 cm. lat., in sicco olivaceus; petioli angustissime alati, adusque 0·5 cm. long. Pedunculi ± 0·5 cm., minute pubescentes. Bracteolæ subulatæ, 0·1 cm. long. Flores albi. Calyx 0·3 cm. long. Corollæ tubus 0·5 cm. long., inferne 0·2 cm., superne 0·25 cm. diam.; labium posticum 0·35 cm. long., hujus lobi triangulares, acutiusculi 0·075 cm. long.; labii antici intus pubescentis lobus intermedius oblongo-ovatus, obtusus, 0·175 cm. long., lobi laterales subrotundati, 0·15 cm. long. Filamenta 0·2 cm. long.; antheræ 0·075 cm. long. Staminodium 0·1 cm. Ovarium anguste ovideum, sursum attenuatum, 0·25 cm., stylus 0·25 cm. long. Capsula 0·45–0·5 cm. long.

The genus, established by Dr. Engler in 1897 for a Somaliland plant, has recently been enlarged by Mr. S. A. Skan to include two Nyassaland species, one of which Mr. Eyles himself recently discovered in the Matopo Hills (*vide* Journ. Bot. 1907, p. 87). The plant described above comes nearest *S. Rivæ* Engl., differing from it in the entire pubescent leaves with more marked distinction between blade and stalk, the pubescent calyx, the distinctly bilobed upper lip of the corolla, the unequal lobes of the lower lip, and the untwisted filaments of the anticous stamens.

Mr. Eyles notes that it is "sometimes loosely pendent from cliff crevices."

Buchnera Eylesii, sp. nov. Herba erecta fere metralis, caule sat valido subtereti scabrido superne ramuloso, ramulis gracilibus quadrangularibus scabridulis pruinosis ut caulis bene foliosis, foliis inferioribus sessilibus brevissimeve petiolatis anguste lineari-lanceolatis acutis basin versus sensim angustatis superioribus anguste linearibus acutis omnibus utrinque scaberrimis, floribus pro rata majusculis in spicis elongatis laxis glabris ramulos terminantibus dispositis, bracteis anguste linearibus calycem semiæquantibus, calycis glabri lobis triangulari-oblongis acutis quam tubus triplo brevioribus scabriusculis, corollæ extus glabræ tubo calycem fere duplo excedente recto lobis inter se æqualibus rotundato-obovatis obtusissimis, antheris brevissime apiculatis, stylo sursum subito dilatato, capsula anguste ovoideo-oblonga acuta glabra.

Hab. Mazoe, Iron-mask Hill; *F. Eyles*, 334.

Caulis juxta solum 0·4 cm. diam.; ramuli sæpissime 0·1–0·2 cm. diam. Folia inferiora 4·5–6·5 cm. long., 0·7–1·0 cm. lat., trinervia, nervo centrali subtus eminente; superiora 2·5–3·5 × 0·1–0·2 cm., summa imminuta et in bracteas transeuntia. Spicæ tandem fere 10·0 cm. long. Bracteæ circa 0·3 cm. long., marginibus scabridis. Corollæ vivæ tubus viridis, limbus albus. Calycis tubus 0·45 cm. long., fere 0·2 cm. lat., longitrorsum costatus; lobi 0·15 cm. long. Corollæ tubus intus pilosus, 1·0 cm. long.; limbus circa 0·7 cm. diam.; lobi 0·35 × 0·3 cm. Stamina juxta medium tubum inserta; antheræ 0·15 cm. long. Ovarium 0·15 cm. long. Styli pars attenuata 0·075 cm. long., pars dilatata ægre 0·1 cm. Capsula 0·6 cm. long., vix 0·3 cm. lat.

To be inserted next *B. Baumii* Engl. & Gilg. from which it differs among other points in its taller stem with scattered, very

scabrid leaves, the long and laxly flowered spikes, the narrow bracts, the broader calyx with differently shaped lobes and the broader corolla-tube glabrous outside.

Acanthaceæ.

Synnema (§ Eu-Synnema) **Acinos,** sp. nov. Caulibus e rhizomate corticato ascendentibus ramulis gracilibus basi foliosis glanduloso-pilosis pubescentibus deinde puberulis, foliis parvis sessilibus brevissimeve petiolatis lanceolatis obtusis vel obtuse acutis glanduloso-piloso-pubescentibus, floribus in axillis superioribus 2–3-nis brevissime pedunculatis, bracteis calyce minoribus lineari-lanceolatis acutis hispide ciliatis, calycis lobis inter se manifeste inæqualibus lobo postico lanceolato-spathulato acuto lobis reliquis linearibus sursum brevissime ampliatis omnibus pilis glandulosis onustis et margine hispide ciliatis, corollæ tubo a calycis lobis superato e basi sensim amplificato labio antico infra lobos plicato late obovato quam anticum lyrato-oblongum breviter bilobum longiore, staminibus 4 anticorum longiorum filamentis inferne dilatatis, ovario puberulo, stylo subincluso inferne piloso, stigmatis lobo postico subobsoleto.

Hab. Glanville, near Bulawayo; *F. Eyles*, 1247.

Planta ± spithamea. Folia sæpissime 1·0–1·5 cm. long., 0·35-0·6 cm. lat. (ramorum nondum rite evolutorum minora), membranacea, in sicco late viridia. Bracteæ ± 0·4 cm. long. Flores nunc cyanei nunc albi. Calycis lobus posticus 0·8–1·0 cm. long., juxta medium 0·3 cm. lat., deorsum ad 0·075 cm. subito coartatus; lobi reliqui 0·7–0·75 cm. long., summum 0·5 cm. lat. Corollæ tubus 0·55 cm. long., basi 0·125 cm., faucibus fere 0·3 cm. diam.; labium anticum 0·65 cm. long., superne 0·5 cm. lat., hujus lobi oblongo-rotundati, obtusissimi 0·25 cm. long.; labium posticum 0·55 cm. long., hujus lobi ovati, 0·075 cm. long. Staminum anticorum filamenta 0·3 cm. long., posticorum vix 0·2 cm. Ovarium 0·15 cm., stylus 0·6 cm. long.

S. brevitubum Burkill is the only African species of § *Eu-Synnema*; this differs from the plant under notice entirely in leaf and in corolla.

Disperma quadrisepalum C. B. Clarke var. grandifolium var. nov. Folia solemniter 7·0–12·0 × 2·0–3·5 cm.

Hab. Mazoe, in sheltered valley near water; *F. Eyles*, 513.

Mr. Eyles's note tells us that this is a plant from $\frac{4}{5}$–1 met. high. It is much larger in leaf than the type and so at first sight appears not to be conspecific with it.

Barleria (§ Eu-Barleria) **Brownii,** sp. nov. Fruticosa, plus quam biorgyalis, espinosa novellis piloso-pubescentibus, ramulis cito puberulis tandem glabris ad nodos aliquantulum tumidis necnon forsan barbellatis, foliis sat longipetiolatis ellipticis apice obtusis sæpe breviter cuspidatis basi parum obliquis obtusis rarius leviter subrotundatis papyraceis glabratis, floribus breviter pedicellatis in cymis perpaucifloris ex axillis superioribus approximatis oriundis ita paniculam brevem et anguste thyrsoideam re-

ferentibus dispositis, bracteis linearibus quam calyx sæpissime brevioribus puberulis, calycis puberuli lobo antico postico subæquilongo oblongo-ovato acuto lobo postico late oblongo-obovato breviter acuminato lobis lateralibus quam exteriores brevioribus lineari-lanceolatis acuminatis, corollæ mediocris extus glanduloso-puberulæ verisimiliter cyaneæ tubo calycem plane excedente superne gradatim amplificato lobis late oblongis obtusissimis antico altius soluto, staminibus longe exsertis staminodiis brevibus antheris parvis coronatis quinti rudimento aspectabili, ovario obovoideo acuto glabro, ovulis solitariis adjecta papilla minuta basali, stylo longe exserto glabro, capsula obovoidea glabra 2-sperma.

Hab. Entebbe, Uganda Protectorate; *E. Brown*, 313. (Herbb. Mus. Brit. and Kew.)

Folia 11·0–13·0 × 4·5–5·0 cm., juniora circa 4·0–6·0 × 2·0–3·0 cm., summa vero adusque 1·5 × 1·2 cm. imminuta, in sicco olivaceo-nigra, subtus pallidiora, fac. sup. cystolithis sub lente nullo negotio aspectabilibus copiose induta; petioli ± 1·5 cm. long., puberuli. Inflorescentia saltem 7·0 cm. long., et corollis neglectis 0·25–0·3 cm. diam. Bracteæ 0·1–0·8 cm. long. Pedicelli 0·1–0·2 cm. long. Calycis lobus anticus 0·9 cm., posticus 1·0 cm. long.; lobi laterales 0·6 cm. long. Corollæ tubus circa 1·3 cm. long., ima basi 0·25 cm., paullo supra basin 0·2 cm., faucibus 0·6 cm. diam.; lobus anticus 1·5 cm. long., lobi reliqui 1·0 cm. Filamenta crassiuscula, 4·5 cm. long., antheræ 0·3 cm.; staminodii filamenta 0·25 cm. long., antheræ 0·13 cm.; quinti rudimentum 0·12 cm. long., filamenta omnia basi dilatata. Stylus circa 4·5 cm. long., stigma vix 0·1 cm. Capsula apice breviter umbonata, fusca.

The late Mr. Clarke left a note about this plant, indicating its affinity to *B. grandis* Hochst., and this is undoubtedly correct, but there are so many differences between the two as to render detailed comparison unnecessary.

Justicia (§ Betonica) **uninervis**, sp. nov. Fruticulosa, novellis puberulis nodisque albido-pubescentibus exceptis glabra, caule erecto anfracto subtereti sursum ramulos teneros ascendentes gignente, foliis sessilibus vetustioribus anguste lineari-lanceolatis obtusis junioribus filiformibus, bracteis lineari-lanceolatis acuminatis basi trinervibus sursum nervo unico perspicuo percursis puberulis in sicco dilute virescentibus, bracteolis bracteis similibus nisi minoribus, calycis puberuli lobis corollæ tubo æquilongis lineari-lanceolatis acuminatis, corollæ tubo sursum levissime amplificato labio postico late ovato apice truncato brevissime bidentato antico posticum æquante obovato alte trilobo, antherarum breviter exsertarum loculo superiore quam inferior paullo breviore, ovario ovoideo glabro, stylo deorsum piloso ceterum glabro, capsula ——.

Hab. Nelspruit, Transvaal; *Rev. F. A. Rogers*, 269.

Planta saltem bispithamea. Folia inferiora firme membranacea, 5·5–7·5 cm. long., sursum 0·5 cm. lat.; costa centralis utrinque prominens; folia filiformia solemniter 3·0–4·0 cm. long., 0·1–

0·15 cm. lat. Strobili ovato-oblongi, 1·5–2·0 cm. long. Bracteæ ± 1·5 cm. long., 0·22 cm. lat. Bracteolæ 0·8 cm. long. Calyx 0·6 cm. long. Corolla extus pubescens intus prope staminum insertionem albide piloso-hirsuta; tubus 0·6 cm. long., deorsum 0·25 cm. sursum 0·3 cm. diam.; labium posticum 0·5 cm. long.; antici lobi 0·3 cm. long. Antherarum loculus sup. 0·1 cm. long., inf. 0·15 cm., hujus calcar vix 0·1 cm. long. Ovarium 0·225 cm. long.

This is easily distinguished from *J. cheiranthifolia* C. B. Clarke by its filiform upper leaves, short spikes, and narrow bracts with only a single nerve in their upper part.

Monechma terminale, sp. nov. Fruticosum, ramosum, ramulis ascendentibus gracilibus rigidiusculis teretibus ultimis foliosis vetustioribus foliis carentibus glanduloso-pubescentibus cito puberulis, foliis parvis sessilibus anguste lineari-spathulatis obtusis concavis utrobique glanduloso-pubescentibus, floribus parvis ad apicem ramulorum approximatis, bracteis bracteolas spathulatas quam calyx breviores excedentibus foliis similibus, calycis lobis 5 anguste lineari-lanceolatis obtusiusculis minute glanduloso-pubescentibus lobo postico abbreviato, corollæ extus minute pubescentis tubo calycem æquante faucibus paullulum dilatatis palato intruso labio postico ovato apice truncato breviter bidentato, ovario oblongo ovoideo minute sericeo, stylo inferne piloso, capsula ——.

Hab. Komati-Poort, 600 ft.; *Rev. F. A. Rogers*, 893.

Folia 0·5–0·7 cm. long., summum 0·15 cm. lat., in sicco prasina. Inflorescentia sæpe perpauciflora et verisimiliter flores nonnunquam solitarii. Bracteolæ vix 0·4 cm. long. Calycis lobi 0·45 cm. long., lobus posticus fere 0·3 cm. Corollæ verisimiliter albæ tubus 0·45 cm. long., deorsum 0·1 cm., sursum 0·225 cm. diam.; lobus posticus 0·4 cm. long.; anticus 0·3 cm., hujus lobi 0·15 cm. long., intermedius quam laterales latior. Antherarum loculus sup. 0·1 cm. long., inf. fere 0·15 cm., calcare 0·06 cm. long. exempto. Ovarium 0·12 cm. long.; stylus 0·6 cm. long.

At first sight much like *M. fimbriatum* C. B. Clarke, but this has a 4-lobed not 5-lobed calyx with strongly ciliate lobes, and so is assigned to another part of the genus. Its nearest affinity seems to be with *M. arenicola* C. B. Clarke, which has different clothing, longer lanceolate acute leaves, linear bracteoles, &c.

The genus, which is tolerably abundant in species in German South-west Africa and in the western parts of Cape Colony, is but poorly represented on the other side of the continent.

Dicliptera Eenii, sp. nov. Planta scabriuscula caule ascendente ramoso una cum ramulis bene foliosis tetragono, foliis parvis petiolatis lanceolatis vel lanceolato-ovatis acutis apice ipso induratis basi rotundatis, spiculis solitariis pedunculatis axillaribus terminalibusve 2-floris flore unico (an semper?) crudo, bracteis parvis inter se inæqualibus ovatis breviter acuminatis trinervibus, bracteolis lineari-lanceolatis acuminatis uninervibus floris crudi valde redactis, calycis lobis inter se inæquilongis anguste lineari-lanceolatis acuminatis vel subaristatis, corollæ tubo bracteas sub-

æquante stricte cylindrico extus puberulo labiis quam tubus longioribus anguste ovato-oblongis antico breviter tridentato postico integro, filamentis labiis paullo brevioribus antheris superpositis muticis, stylo minute bidentato.

Hab. Damaraland; *T. G. Een.*

Folia 1·5–2·0 cm. (raro 3·0 cm.) long., 0·6–1·5 cm. lat., utrinque cystolithis copiose instructa; petioli ± 0·4 cm. long. Pedunculi 0·3–2·0 cm. long. Bractea antica 1·0 cm. long., postica 0·6 cm., ambæ virides. Bracteolæ floris perfecti 0·7 cm. long. Calycis lobi 0·6–0·7 cm. long., 0·05–0·09 cm. lat. Corollæ tubus 0·8 cm. long., 0·2 cm. diam.; labia 1·15 cm. long. Filamenta 0·9 cm. long.; antheræ 0·1 cm. long. Ovarium 0·1 cm. long.; stylus puberulus, 1·5 cm. long. Capsulæ valvæ oblongæ, puberulæ, 0·65 cm. long. Semina 0·275 × 0·2 cm., levia, castanea.

Known from *D. maculata* Nees chiefly by the small leaves, the laxly arranged spikelets, and the shape of the small bracts.

[Correction.—*Pentanisia spicata* (*vide* p. 38) is withdrawn, the plant described under that name being *Otiophora scabra* Zucc. Mr. Britten drew my attention to this mistake, the result of an error of observation with regard to the position of the ovule in the cells.]

SPARTINA TOWNSENDII.*

By Otto Stapf, Ph.D., F.L.S.

Giving evidence some time ago before the Royal Commission on Land Erosion, Lord Montagu of Beaulieu called attention to the rapid spreading of a grass on the mudbanks of the Hampshire coast. According to him, it was accidentally introduced from the Argentine not many years ago and locally known as Rice Grass or Sea Rice. It was a rapid grower, overrunning mudbanks which had been hitherto bare and exposed, solidifying and raising them. The area covered by the grass was estimated at six thousand to eight thousand acres. The matter was submitted to the Director of the Royal Botanic Gardens at Kew,† and subsequently I was invited to investigate the subject from the scientific point of view. Having during the last few months paid a number of visits to various points on the Hampshire coast and in the Isle of Wight to study the question in the field, I propose to give here a preliminary sketch of the history of the grass and the present extension of its area, adding at the same time a short technical paragraph for those who wish to make themselves familiar with the grass and the allied species which occur along with it.

[* Reprinted by permission from *The Gardeners' Chronicle*, Jan. 18th, 1908, where the paper is further illustrated by two maps showing distribution.]

† See the article on "Mudbinding Grasses" in *Kew Bulletin*, 1907, No. 5, pp. 190–197.

The grass which Lord Montagu had in view is *Spartina Townsendii*, a member of a genus numbering about eighteen species, mostly natives of America. With few exceptions, they inhabit sea marshes and muddy foreshores, under favourable conditions cover-

Spartina stricta ($\frac{1}{3}$ natural size).

ing hundreds and even thousands of acres. Four species are known to occur in Europe. Two, *S. juncea* and *S. alterniflora*, were introduced from the Atlantic coast of America, probably during the first half of the last century. *S. juncea* is confined to the western basin of the Mediterranean.

The other, *S. alterniflora*, was discovered by Loiseleur in the estuary of the River Adour near Bayonne in 1803, and then in 1829 by Borrer in the Itchen River near Southampton. A very complete account of it as it appeared there in 1836 was given by Bromfield.* It has since then spread to some distance north of Northam Bridge in the Itchen River and to the Southampton Water as far as the Titchfield River on the eastern, and from Hythe to Redbridge on the western bank and from there to Millbrook. In France the grass has extended its area over a coast line of about twenty-five miles from Cap Breton (Landes) to the estuary of the Bidassoa River.

Of the three remaining species, one, *S. stricta*, has been known for a long time (since 1629), and is beyond doubt truly indigenous in Europe. It is found in England along the east coast from southern Lincolnshire to the Thames and on the south coast from Chichester to the Solent. On the Continent it occurs along the Atlantic coast from the estuary of the Schelde to near Gibraltar, and in a detached area at the head of the Adriatic. A continuation of the Atlantic area is found on the coast of Morocco from Tangier to Mogador. The other two species are *S. Neyrautii* and *S. Townsendii*. *S. Neyrautii* was discovered by Neyraut near Hendaye in the estuary of the Bidassoa River about fifteen years ago, and was described by Foucaud (1894), who suggested that it was a hybrid between *S. alterniflora* and *S. stricta*, among which it is found growing.

S. Townsendii was first recorded by the brothers H. and J. Groves in 1879 from Hythe in the Southampton Water; but we have evidence that it existed there as early as 1870. According to the brothers Groves, it was already in the 'seventies rather common on both sides of Hythe Pier. This for years remained the only station. In 1883 it had not yet travelled beyond Cracknore Hard (two miles north of Hythe). In the Isle of Wight it was observed in 1893 (Yarmouth) and 1895 (Medina River); but nearly all other first records date from 1900 or after. To what extent it has spread during the last seven or eight years can be seen from the map [in Gard. Chron. *l.c.*]. The area thus conquered by the aggressive newcomer extends at present over a coast line the extreme points of which are over fifty miles distant. It would be tedious to trace the advance in detail; a few instances may suffice. In 1893 [Rev. E. F.] Linton found "several strong patches" of it near Yarmouth on the road leading from that place to Freshwater.† To-day it completely covers the mudbanks in the River Yar; it invades the adjoining marshland, and scattered clumps may be seen as far up as Freshwater Church. A few years ago, Lord Montagu assures me, there was no trace of it in the Beaulieu River; now it predominates everywhere to beyond Buckler's Hard, to quote from a manuscript report by Mr. J. F. Rayner, of

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* Bromfield in Hooker's *Companion to the Botanical Magazine*, vol. 1, pp. 254–263, partly reprinted in *Kew Bulletin*, l.c.

† [Report Bot. Exch. Club for 1893, 427.]

Southampton, "not only fringing the water, but running along every dyke, filling every pool and invading the broad borders of

SPARTINA TOWNSENDII ($\frac{1}{5}$ natural size).

marshland," and its advanced posts stand within half a mile of Beaulieu village. In 1895 and 1896, so Cosmo Melvill tells us,* there was none of the grass visible on the marshes and mudflats

* [Report Bot. Exch. Club for 1905, 47.]

between Hurst Castle, Milford, and Keyhaven; but in 1905 it was "plentiful and evidently rapidly increasing." On the roadstead of Poole Harbour a single small clump was discovered by Mansel-Pleydell in 1899. Six years later Riddlesdell found it "in some quantity" by the fever hospital at Poole, whereas Mr. W. J. Goddard describes it in a letter to Col. Prain, dated October 8 of last year, as occurring in hundreds of big clumps all round the harbour on nearly every mudflat.

To explain the sudden appearance of the grass three theories suggest themselves. It may, like *S. alterniflora*, have been introduced, as Lord Montagu thinks; but so far no *Spartina* corresponding to *S. Townsendii* has been found in America; or it may have originated by way of mutation. It could only have sprung from *S. stricta*, which formerly occurred in Southampton Water; but *S. stricta* is little given to variation, and the differences are not of a character to support this theory. There is finally the hypothesis of the hybrid origin of *S. Townsendii*. This idea is not new; it was suggested by Foucaud in his note on *S. Neyrautii*. According to him, the latter was a hybrid of the formula *S. alterniflora* × *stricta*, whilst *S. Townsendii* was *S. stricta* × *alterniflora*. Two circumstances lend considerable strength to that view; first, the fact that *S. Neyrautii* as well as *S. Townsendii* actually combine not a few of the distinctive morphological and anatomical characters of the supposed parent species, and, secondly, their occurrence just in the two—and the only two—parts of the world where *S. alterniflora* and *S. stricta* have met, namely, at the head of the Bay of Biscay and in the Southampton Water. This coincidence is very remarkable and has almost the demonstrative force of an experiment, the more so as *S. Neyrautii* and *S. Townsendii* approach each other so closely that they could not stand as distinct species if one wished to leave the theory of their hybrid origin out of consideration.

But another question, perhaps of more practical interest, presents itself. What are the conditions that enable the grass to spread with such amazing rapidity and get so firm a hold? The dispersal is no doubt mainly by seed. The grains fall with the spikelets, which float and would be carried about by the tides and currents until they are left on the beach or get caught somehow on the mudbanks. The grass does not seem to seed very freely, although it flowers profusely; but a few fertile clumps, as I have seen them, would after all give a good supply. When the seeds germinate, under natural conditions, we do not yet know. Possibly they behave like those of *Zizania aquatica* (a gregarious aquatic grass of North America), which lie in the water over the winter and germinate in the following spring. The seeds of these two grasses are remarkably similar, although the grasses are not allied at all. They have a highly developed embryo, which, in *S. Townsendii*, is considerably larger than the endosperm and bright green throughout, including even the leaf-like scutellum, which suggests that the process of germination passes off very quickly and effectively. Once established, the seedlings would soon grow

into tufts with plenty of stolons radiating in all directions and anchoring themselves in the mud by long thread-like roots, which descend vertically. So firm is their grip on the soft substratum that even small tufts cannot easily be pulled up; and when I visited Quarr Abbey (Isle of Wight) after the heavy October gales of last year I could find no traces of uprooted *Spartina* on the beach, although there was an extensive bed of it on the foreshore. The grass is evidently wonderfully adapted to life on mudflats; to this must, however, be added as a factor favourable for its establishment the practical absence of all competition except where it meets with its congeners *S. alterniflora* and *S. stricta*. The former has so far made a good stand against the inroads of *S. Townsendii*, whilst *S. stricta* is evidently doomed to succumb.

The immediate effect of the appearance of this pushful grass on the mudflats of the south coast has been to relieve their bareness and even to beautify them to some extent, and it has no doubt already affected animal life. Physical changes must follow, which, if the grass continues to flourish and spread, will react on the general conditions of the foreshore, resulting probably in the solidification and raising of the mudbanks; but this process will take time. It is at present barely beyond the first stage. Whether the result will in the end be beneficial or to the contrary will depend greatly on local conditions. In any case it will be a change worth watching and studying.

Key to the British Species of Spartina.

1. S. stricta.—Forming small tufts ½ to 1½ feet high; rhizomes and stolons wiry; culms with a succession of up to 15 tight, firm, short sheaths, which, with the exception of the upper, soon throw off the blades; spikes usually 2, sub-contiguous, rigid, overtopping the leaves; spikelets 5½–7 lin. long, pubescent; second glume 3-nerved, lateral nerves delicate, tips hyaline.

2. S. Townsendii.—Forming large clumps or beds 2-4 feet high; rhizomes and stolons soft; culms with a succession of up to 10 or 12 somewhat soft sheaths, much increasing in length upwards, the lowest throwing off the blades; spikes usually 3–5, suberect, rigid, overtopping the leaves; spikelets about 8½ lin. long, delicately pubescent; second glume 3–6-nerved, with 1 or 2 stouter side nerves, keeled, keel ending abruptly below the short hyaline tip.

3. S. alterniflora.—Forming large clumps or beds 2–3 feet high; rhizomes and stolons soft; culms with a succession of up to 8 or 9 soft and very smooth sheaths, not throwing off the blades, which gradually decay; spikes usually 5-7, suberect, slender, and often slightly flexuous, overtopped by the long drawn-out blades; spikelets glabrous to the naked eye, 6-7½ lin. long; second glume delicately 5–6-nerved, keeled to the very tip.

COLPOMENIA SINUOSA IN BRITAIN.

By A. D. Cotton, F.L.S.

During the past two or three years the brown alga *Colpomenia sinuosa* Derbes & Sol. has been recorded for the first time from several localities on the coasts of Normandy and Brittany. *Colpomenia* is a southern alga which has long been known both from tropical and temperate seas, including the Mediterranean, but which had not previously been found in Europe further north than Cadiz. In the Gulf of Morbihan, and at Cherbourg, this alga now occurs in abundance, and is, moreover, causing considerable anxiety to the oyster-cultivators, on account of the damage it occasions to their industry.

During 1907 *Colpomenia* was discovered in two localities in Britain: at Torquay, by Mr. E. M. Holmes; and at Swanage, by the writer. At Torquay the plant was plentiful, though for the most part sterile; after careful searching, however, Mr. Holmes succeeded in finding fertile specimens. A full account of the appearance of *Colpomenia* in the English Channel, together with illustrations of the plant and references to literature, will be found in the *Kew Bulletin*, 1908, No. 2.

The subject is brought before the notice of readers of this Journal in the hope that further information may be obtained as to the presence of this alga on the south coast, and as to how and when it first arrived on our shores. In France *Colpomenia* had not been observed before 1905. In that year it was collected at Vannes, and in the following year and in 1907 at several places in the neighbourhood of Cherbourg. In both localities it was growing vigorously. The French writers suggest that the influence of the Gulf Stream is sufficient to account for the luxuriant growth of a southern alga; but since the conditions of the English Channel appear to be so suitable, it is not easy to understand why an alga that has been known from Cadiz for over a century should not have previously spread in a northerly direction, especially as the Portuguese coast receives the full benefit of the Gulf Stream. The manner of its arrival on the British shores is equally obscure. If the alga is slowly spreading up the Channel, currents may be largely responsible for its dispersal; on the other hand, it may have been introduced by vessels. It is possible also that *Colpomenia* may have been conveyed to Britain with the oysters that are imported from France to be "fattened" on the English culture-grounds; information as to this point is not yet to hand. Any details as to its presence in other localities might do much towards clearing up the question.

The French ostréiculteurs have given *Colpomenia* the name of "Ballons," from their frequently becoming detached from the substratum and rising to the surface of the water. The "Ballons" are irregular in shape, and vary from the size of a marble to that of a tennis ball. Sauvageau accounts for the tendency to float as

follows:—In old plants small perforations arise at the base of the bladder-like thallus, allowing at the lowest tides the water to run out; at the return tide the water re-enters the alga from below, but does not displace all the air which has entered during exposure, the result being that the alga becomes buoyant. At Vannes, where *Colpomenia* is found growing on the oyster-beds, the "Ballons" frequently bring with them to the surface the young oysters to which they are attached; large numbers of these are thereby lost.

In form and general appearance *Colpomenia sinuosa* resembles *Leathesia difformis* Aresch. (= *L. tuberiformis* S. F. Gray), with which it has often been confused. It may be distinguished from that plant by the thinner, non-gelatinous walls, and by the structure, which is cellular and not filamentous. *Leathesia* also is usually lobed, even when quite young, and possesses a resiliency which is lacking in *Colpomenia*.

The seasons during which *Colpomenia* may be found are not accurately known. It may occur more or less throughout the entire year, but certainly is in full growth, at all events on the French coast, during March and April. The plant occurs as an epiphyte, usually immediately above the level of low water, and is frequently found washed ashore.

The writer would be glad to learn of any fresh localities in which the alga may be detected, and would suggest to those who possess dried collections the possibility of *Colpomenia* having been put away as *Leathesia*.

CARMARTHENSHIRE PLANTS.

By Arthur Bennett.

This list of species for Carmarthenshire, additional to those recorded in *Topographical Botany*, ed. 2, 1883, has been drawn up mainly to record a series of specimens sent me by Mr. H. H. Knight, of Llandovery, during the publication of the Supplement in this Journal in 1905, but too late for inclusion therein.

It is evident from recent records that Wales has a much richer Flora than was formerly supposed; while many of the plants recorded present problems not easy to solve. Among such are *Carex aquatilis* (Cardigan), *Liparis Loeselii* (Glamorgan and Carmarthen), *Sesleria cærulea* (Glamorgan). and an old record. *Draba aizoides* in Glamorgan, abundant for miles along the sea-cliffs, and not merely from Pennard Castle, is the wild form of the species, and it would be interesting to know whether our plant is nearest the French (normal), Spanish (*D. Dedeana* Boiss.), Italian (*D. Bertolonii* Nyman), or German (*D. Beckeri* Kern.), forms considered subspecies by Nyman.

In the *Botanists' Guide* (1805) fifteen species of plants only are recorded for Carmarthen; these are simply restated in the *New Botanists' Guide* (1835), and no additions are made in the Supple-

ment thereto (1837). The records in Top. Bot. ed. 2, its Supplement, Mr. Barker's list in his *Natural History* of the county (1905), and Mr. Knight's additions, make the total number on record for the county about 845 species, exclusive of some species of *Rubus*. In the following records B. = Mr. Barker's *Natural History of Carmarthenshire*, K. = Mr. Knight's localities.

That there is yet much to be done in South Wales is evident from the continual new records being made, especially in Glamorganshire. This county, with Brecon and Carmarthen, will eventually be found to possess many subalpine species that only come south in England as far as Yorkshire, North Wales of course excepted.

Clematis Vitalba L. Limestone thickets, hills west of Llandebie in great quantity, *Ley*, *Record Club Report*, 1884, 5.

Thalictrum dunense Dum. Llanstephan, *H. L. Jones*, *R. C. Rep.* 1876, 115.—*T.* (*montanum*) *collinum* Wallr. Llynyfanfach, Llangadock, *B.*

Ranunculus circinatus Sibth. Near Kidwally, with *R. Baudotii* Godr., *B.*—*R. peltatus* Schrank. *Journ. Bot.* 1901, 344.

Trollius europæus L. Fields by Gwydderig, above Llandovery, *K.* Frequent in the north-eastern part of Carmarthenshire, and ascends to 2000 ft. in Carmarthen Fan.

†*Helleborus fœtidus* L. Hedge, Llandefeilog, *B.*—*H. viridis* L. Near Kidwally, *B.*; "found by Mr. Browne."

Meconopsis cambrica Vig. By River Towy, near Llandovery. "I used to think this was an escape, but I think now it may be really wild. Dr. Salter, of Aberystwith, has seen this plant in the upper part of the River Towy near Ystrad-ffin." *K. in litt.*

Berberis vulgaris L. Pumpsant, *K.*, *B.*

Papaver Lamottei Bor. Pendine, *Jones*, *R. C. Rep.* 1880, 52.

Fumaria confusa Jord. Near Ferryside, *B.*

Subularia aquatica L. *Journ. Bot.* 1904, 114. Llynyfanfach, *B.*

Polygala oxyptera Reichb. Llandovery, *K.*—*P. serpyllacea* Weihe. Pendine, *B.*

Dianthus Armeria L. Rocky slopes of Warleigh Hill, *Mrs. Oakeshott*, *R. C. Rep.* 1876, 118. Very rare in Wales; "extinct in Anglesea," *Griffith*; an alien in Glamorgan, fide Trow. *Fl. Glam.* 31; so there remains for Wales only the Carmarthen record.

Cerastium quaternellum Fenzl. Llandovery, Llangadock, Myddfai, *K.* sp.

Stellaria nemorum L. Near Llandovery, *K.* sp. Sent also by Mr. Knight from River Gwydding, near Trecastle, Brecon, from which county it is a new record.

Sagina apetala L. Streets of Llandovery, *K.* sp.—*S. subulata* Presl. Llandovery, *K.* sp.

Buda marina Dum. Banks of River Towy, *B.*—*B. rupestris* Druce. Cliffs at Pendine, *Jones*, *R. C. Rep.* 1880, 53.

Hypericum quadratum Stokes. Glynlin, *Ley*, *R. C. Rep*, 1884, 8. —*H. humifusum* L. Near Llandovery, *K.* sp.

Tilia cordata Mill. By Sawdde Fechan, near Gwynfir, *K.* sp.

Radiola linoides Roth. Roadside near Mams, *K.* sp.; also near Pendine, *K.*

Geranium pratense L. Llandovery, Godas Grove, *K.*

Erodium moschatum L'Hérit. *Dr. H. L. Jones, B.*—*E. maritimum* L'Hérit. Pendine Cliffs, *B.*

Rhamnus catharticus L. Limestone thickets on hills west of Llandebie, and on cliff, Castle Cennena, *Ley, R. C. Rep.* 1884, 8.

Melilotus officinalis Lam. Near Kidwelly, *B.*

Trifolium subterraneum L. Pendine, *B.*—*T. squamosum* L. Near Carmarthen, *K. & B.* sp.—*T. striatum* L. Pentrae Burrows, *K. & B.* sp.—†*T. hybridum* L. Once, near Cwmffrwd, *B.* 53.—†*Coronilla varia* L. "Apparently wild by the roadside between Carmarthen and Kidwelly," 1906, *K. & B.* sp. In some places this species seems to be becoming semi-naturalized.

Vicia lathyroides L. Ferryside sandhills, *B.*

Prunus Cerasus L. Llandovery, *K.* sp.—*P. Padus* L. Llandovery, *K.* sp.

Spiræa Filipendula L. Once, near Nawlybwla, *B.*—†*S. salicifolia* L. *Dr. Jones* ex *B.*

Rubus saxatilis Gynfir. *K.* sp.

The following list of Carmarthen Rubi is entirely due to Rev. W. Moyle Rogers, who writes:—

"When the name of the locality is not followed by that of the collector, it is to be understood that Rev. A. Ley is the collector, and that his specimens have been seen and accepted by me. Where the collector's name occurs after the locality, I am responsible only for those cases in which collector's name is followed by the sign !"

R. idæus L. Glynhir; Nant-mwyn, *Ley.*—*R. fissus* Lindl. Nant-mwyn; Bwlch-y-ffin.—*R. suberectus* Anders. Nant-melyn; Dothre Glen; Glen Twrch—*R. plicatus* Wh. & N. Nant-mwyn. —Var. *hemistemon* Talley, *Ley.*—Var. *Bertramii* G. Braun. Nant-mwyn; Glynhir.—*R. Cariensis* Genev. Glynhir.—*R. Lindleianus* Lees. Gwdderig, *Rey.* Llandebie; Carreg Cennen; Nant-mwyn. —*R. argenteus* Wh. & N. (formerly *R. erythrinus*). Llandebie; Glynhir.—*R. rhamnifolius* Wh. & N. Glynhir.—*R. Silurum* Ley. Head of Llwchwr Valley; Nant-mwyn.—*R. Scheutzii* Lindeb. Nant-mwyn, 1897.—*R. dumnoniensis* Bab. and *R. pulcherrimus* Neum. Nant-mwyn; Glynhir.—*R. Selmeri* Lindeb. Nant-mwyn. *Ley.*—*R. gratus* Focke. Near Llandebie, *Ley*; Talley, *Ley*; Glynhir.—*R. Godroni* Lec & Lam. (formerly *R. argentatus*). Glynhir. —Var. *robustus* P. J. Muell. Glen Twrch.—*R. rusticanus* Merc. Llanddarog, *Marshall.* Glynhir, *Ley.*—*R. macrophyllus* Wh. & N. Llandevarn. — Var. *Schlechtendalii.* Whe. Glynhir (forma). — *R. Questierii* Lef. & Muell. Nant-mwyn; Rhondirmwyn.—*R. mollissimus* Rogers and *R. iricus* Rogers. Glynhir.—*R. pyramidalis* Kalt. Pont-Amman, *Ley*; Nant-mwyn; Glynhir. — *R. leucostachys* Sm. Llanddarog, *Marshall*, Glynhir, *Ley.* — Var. *gymnostachys* Genev. Pant-y-Llyn, *Griffith* ! Glynhir.—Var. *angustifolius* Rogers. Glynhir; Nant-mwyn. — *R. mucronatus* Blox. Cwm Twrch; Nant-mwyn —*R. Gelertii* Frider. Cwm Twrch.—

Var. *curvideus* Ley. Carreg Cennen; Glynhir.—Var. *raduloides* Rogers. Nant-mwyn.—*R. melanoxylon* Muell. & Wirtg. Carreg Cennen.—Var. *Leyanus* Rogers. Llandilo (var.), *H. A. Evans*! Glynhir; Llandebie; Cwm Gwdderig, *Ley*.—*R. Borreri* var. *dentatifolius*. Glynhir.—*R. Babingtonii* Bell Salt. Nant-mwyn.—*R. Bloxamii* Lees. Glynhir (var.).—*R. scaber* Wh. & N. Nant-mwyn.—*R. longithyrsiger* Bab. Glynhir.—*R. rosaceus* Wh. & N. Head of Towy Valley.—Var. *hystrix* Wh. & N. Gwdderig.—Var. *infecundus* Rogers. Carreg Cennen, *Ley*.—*R. dasyphyllus* Rogers. Glynhir; Nant-mwyn.—Var. *semiglaber* Rogers. Cwm Twrch.—*R. viridis* Kalt. Nant-mwyn; Pont Gwdderig.—*R. hirtus* Wh. & N. (sp. coll.). Gweddrig.—Var. *ferox* Weihe. Glynhir.—Var. *britannicus* Rogers. Nant-mwyn.—*R. corylifolius* Sm. (sp. coll.). Llandebie, *Ley*.—*R. cæsius* L. Glynhir; Llandebie, *Ley*.—*R. saxatilis* L. Nant-melyn, *Ley*.

†*Cotoneaster microphylla* Wall. On the lime rocks at Llangendeirne, *B.* ex *K.*

Geum rivale L. Wet woods, Glynhir, *Ley*, *R. C. Rep.* 1884, 9. Rare in the Towy Valley above Llandovery; frequent on the Old Red Sandstone, ascending to 2000 ft. on Carmarthen Fan, *K.*

Alchemilla vulgaris L. var. *pratensis* Pohl (*A. pratensis* Schmidt). *Journ. Bot.* 1895, 111.

Agrimonia odorata Mill. Near Llandovery, *K.* sp.

Rosa mollis Sm. Old Quay, near Glynfir, *Ley*, *R. C. Rep.* 1876, 102.—*R. canina* L. vars. *lutetiana* and *arvatica*. Hills near Llandelio, *Ley*, *R. C. Rep.* 1884, 11.—Var. *urtica* and *verticillacanthas* Glynlin and Llandelio, *Ley*, *R. C. Rep.* 1884, 12.

**Pyrus rupicola* Syme. Rocks at Cerreg Cennen Castle, Llandilo, *K.* sp., *Ley*, *R. C. Rep.* 1884, 13.

**Saxifraga granulata* L. Towy Valley, near Llanegwad and Gwendraeth Valley, *B.*; Llandovery, *K.*—*S. hypnoides* L. Limestone hills between Cerreg Cennen and Cerreg Anman, *Ley*, *R. C. Rep.* 1883, 16. On the hills from near Llandebie to Carmarthen Fan, on or not far from the limestone.

Chrysplenium alternifolium L. Llandovery and Llangadock, *K.*

Sedum rupestre L. Rocks and walls near Danygraig, &c., *B.*—*S. Forsterianum* Sm. Llyn-fair-fach, *K.*

Epilobium adnatum Griseb. *H. L. Jones* ex *B.*

Circæa alpina L. and *intermedia* Ehrh. Near Ystraddffin, *K.*

Sium erectum Huds. Near bridge over Whityer stream near Langharne, *B.*

Pimpinella major Huds. *H. L. Jones* ex *B.*

Myrrhis odorata Scop. Myddfa, *K.*

†*Sambucus Ebulus* L. Near ruins of Llandovery Castle; near houses at Rhandirmoyn, *K.*

Rubia peregrina L. Maritime rocks, Llanstephan, *H. L. Jones*, *R. C. Rep.* 1876, 124.

†*Anaphalis margaritacea* Benth. & Hook. f. On the hills, Cwm Sawdde Fechan, *K.*

Hieracium saxifragum Fr. *β orimeles* F. J. Hanb. Carmarthen Fan, *Journ. Bot.* 1902, 311.—*H. hypochæroides* S. Gibs. *β saxosum*

F. J. Hanb. Llyn-fan-fechan, 1899, 8, *Ley*, *B. E. C. Rep.* 1901, 637.—*H. murorum* L. (ex parte).—Var. *pellucidum* Almg. Riverside rocks, Llangdoc, *Ley*, *B. E. C. Rep.* 1897, 556.—Var. *ciliatum* Almg. Nanty-sorwyn, *Ley*, Williams, *Prod. Fl. Brit.* 1902, 141. —Var. *crebridens* Dahlst. Carmarthen Fan, *Ley*, Williams, *l. c.* 144.—*H. sagittatum* Lindeb. var. *maculigerum* W. R. Linton. Fanfechan Cliff, July 4th, 1905, *Ley*, *B. E. C. Rep.* 1906, 175.—*H. sylvaticum* Gouan var. *lucidulum* Williams. Llangadock-fawr, *Williams*, *l.c.* 137.—*H. euprepres* F. J. Hanb. Carmarthen Fan, Riddelsdell, *B. E. C. Rep.* 1902, 53.—*H. sciaphilum* Uechtr. Mountain-banks, Nant-mwyn, 1897, *Ley*, *B. E. C. Rep.* 1898, 506. —Var. *pulchrius* Ley. Carmarthen Fan, *Ley*, *B. E. C. Rep.* 1904, 23.—*H. vulgatum* Fr. var. *dædalopium* Dahlst. Common on mutual borders of Brecon and Carmarthen, *Journ. Bot.* 1902, 312. —*H. rigidum* Hartm. var. *serpentinum* F. J. Hanb. Llyn-fan-fechan, 1899, *Ley*, *B. E. C. Rep.* 1901, 639.

Gnaphalium sylvaticum L. Llandweg, *K.* sp.

†*Doronicum Pardalianches* L. Talians, *K.* ex *B.*

Senecio viscosus L. Landovery in the stony bed of River Towy; also the River Bran above Llandovery.

Matricaria Chamomilla L. Kidwelly; Llandovery, 1907, *K.*—*M. discoidea* DC. Pendine and neighbourhood, *K.*

Arctium Newbouldii Ar. Benn. Llandovery, *K.* sp.—*A. majus* Bernh. Pendine, *K.* sp.

Lobelia Dortmanna L. Found by Lightfoot in Tally lakes, 1773, *Journ. Bot.* 1905, 307. "I believe this is now extinct," *K.*

[*Pyrola secunda* L. Will probably be found in this county, as it occurs in Brecon at 1750 ft. (*K.* sp.), in Glamorgan (*Trow* sp.) and Monmouth (*Ley* sp.). It would have seemed more likely to have occurred in North than in South Wales. Its nearest habitat to Wales seems to be North-west York (alt. 2000–2200 ft.), but is very rare. "In Monmouth it is associated with *Pyrus Aria* and *P. rotundifolia*, *Sedum rupestre*, *Saxifraga hypnoides*, *Pyrola minor*, *Convallaria majalis*, *Polygonatum officinale*, and other more ordinary limestone plants," *Ley*, *in litt.*]

Primula veris L. Rocks above Lyn-y-fan Fach, *K.* sp., grown at an altitude of about 2000 ft. Old Red Sandstone rocks form a semicircle, and nearly vertical; they are always sheltered from the sun's rays, *K.* sp. The highest altitude given by Watson is 1650 ft. in the Tyne province. In Scotland I can find no record above 1550 ft. It grows in Norway at 2000 ft. (Blytt), and in the Caucasus at 3750 ft. (Meyer), and province Lenk, Russia (Hohenhack.) at 3750 ft., while *P. acaulis* L., in the same province, occurs at 4500 ft. (Hohenhack.). These Carmarthen specimens are well developed; one example has four heads of flowers. Carmarthen Van (Fan), on which this grows, is 2596 ft. high.

Erythæa littoralis Fr. Kidwelly Burrows, *B.*

Vinca major L. Near White Mill, *B.*

Gentiana baltica Murb. Llandovery, *K.* sp.

†*Pulmonaria officinalis* L. Near Conwill and Oaklands, escape, *B.*

Cuscuta Trifolii Bab. Llandovery, *K.*
Verbascum Blattaria L. Ferryside, *B.*
Linaria repens × *vulgaris*. Frequent about Llandovery, *K.*—†*L. supina* Desf. Railside by Pembrey Canal, *B.*
Limosella aquatica L. Bishop's Pond, *B.*
Veronica hybrida L. Cerreg Cennen, *K.* sp.
Utricularia vulgaris L. Near Kidwelly, *Mr. Browne*, *B.*
Mentha longifolia Huds. Llandovery, *K.* — *M. piperita* L. Stream-side near Llwchyr Head, *H. L. Jones* ex *B.*; *Ley*, *R. C. Rep.* 1884, 18.
Lamium amplexicaule L. On wall, Kidwelly. December, 1906, *K.*
Teucrium Chamædrys L. "Carmarthenshire"; specimens so named in herb. Sowerby at Brit. Mus.
Populus alba. Near Golden Grove, *B.*
Salix herbacea L. Carmarthen Fan; alt. 2250 ft., *K.*; first found by the Rev. A. Ley. This is a larger form than the usual Scotch specimens. Tracing the plant from Wales; Brecon at 2850 ft. (*J. Woods*); Carnarvon, 2800 ft. (*Ley*); to West Yorkshire, 2300–2400 ft. (*Lees*); Cumberland, 2500–2600 ft., lowest limit (*Hodgson*); Outer Hebrides: North Harris, 800 ft. (*Duncan* sp.); Scarp, 750–1011 ft. (*Duncan* sp.); St. Kilda, 600 ft. (*Barrington*); Fair Isle (*Straker* sp.); Shetland 938–1470 ft. (*Tate*); and Donegal, 870 ft. (*Hart*).—*S. rubra* Huds. (*S. purpurea* × *viminalis*) Top. Bot. ed. 2, 375.—*S. Smithiana* Willd. (*S. viminalis* × *caprea*) Top. Bot. *l. c.*
Neottia Nidus-avis Rich. Three woods near Llandovery, *K.* sp.
Orchis latifolia L. Near Landovery, *K.* sp.
Habenaria albida R. Br. and *H. viridis* R. Br. Near Llandovery, *K.*

Liparis Loeselii Rich. Gathered in the summer of 1897, and taken to Mr. Barker for identification, who found it the following year on the coast near Pembrey. In 1906 Mr. Knight gathered specimens from one locality, and saw it in two others in the hollows of the sand-hills about a quarter of a mile from the sea. It was associated with *Orchis incarnata* L., *Epipactis palustris*, *Hydrocotyle*, *Mentha hirsuta*, *Anagallis tenella*, *Carex glauca*. On slightly higher ground close by were *Linum catharticum*, *Potentilla Anserina*, *Lotus corniculatus*, *Polygala serpyllacea*, *Euphrasia*, *Blackstonia*, *Salix repens*, *Carex arenaria*, *C. Goodenovii*, and *Ophioglossum vulgatum*. These specimens of *Liparis* and others from Glamorganshire represent exactly the plant of the Friesian Islands (both German and Dutch), and of the dune specimens of the Dutch coast. The tallest specimens I have seen are 1½ dm. high, with nine flowers, and the remains of the last year's stem intact. In East Anglia I have seen it 2½ dm. high, and Mr. Fryer has found it 3 dm., with thirteen flowers. One from Norfolk has four years' growth, representing the two years' remains of stem, the third year with seed-vessels, and the flowering fourth year. This example has grown almost horizontally 2·5 cm., while another from a depression has a nearly vertical extension of 6·15 cm., with

intervals of 2·5 cm. between the pseudo-bulbs. The growth of this species is discussed by Crépin in Bull. Acad. Belg. xviii. 102 (1865). From the Glamorganshire station the Rev. H. J. Riddelsdell has sent me a list of forty-two species, growing with or near *Liparis*. In Norfolk I have listed forty-two species growing with it, and Mr. Fryer, in Cambridgeshire, eighty species. Notes on the new stations of *Liparis* will be found in Trans. Norf. & Nor. Nat. Soc. viii. 340 (1907).

Polygonatum multiflorum All. Llandilo, *K.* sp. Rare in Wales, recorded by Mr. Griffith as a denizen in Anglesea, and by Dr. Shoolbred in Monmouth.

[*Scilla verna* Huds. is so plentiful along the coasts of Anglesea, Carnarvonshire (and occurs in Glamorgan), Cardigan, Flint, and Merioneth, that it will surely be found in Carmarthen if sought early in the year.]

Allium Schœnoprasum L. Near Llandilo, *K.*—*A. oleraceum* L. In a sandy field, Llanstephan, *Mrs. Oakeshott*, *R. C. Rep.* 1876, 131.

Sparganium affine Schnizl. Llyn-y-fair-fach, *Journ. Bot.* 1901, 344, *K.* Mr. Riddelsdell thinks the plant of this may be *affine* rather than *minimum*. I have *affine* from Carnarvon and Anglesea, but have not seen it from South Wales.

Potamogeton alpinus Balb. Llyn-fair-fach, *K.* Rare in Wales; Anglesea (*Wilson* in Herb. Edinb. !), Carnarvon !, Pembroke, and Denbigh.

Zannichellia pedunculata Reichenb. Penbrae Burrows, Kidwelly, *K.* sp.

Scirpus fluitans L. Llandovery, *K.*

Eriophorum latifolium Hoppe. Pont Aber; Llangstock, *K.*

Carex disticha Huds. Field near Pembrey, *K.* sp.

Milium effusum L. Moelpe Wood, near Carmarthen, *B.*; Llandovery, *K.*

Avena pubescens Huds. Carreg Cennen, *K.*

Koeleria cristata Pers. Pendine Cliffs, *B.*

Glyceria plicata Fr. Llandovery, *K.*

Bromus arvensis L. Llandovery, *K.*

Hymenophyllum tunbridgense Sm. Llandilo; rocks near Llangadock, *K.*

Asplenium lanceolatum Huds. Pendine, on rocks by the sea, *K.* sp.

Lastrea spinulosa Presl. Gorsagoch, *B.* 102.—*L. Thelypteris* Bory, *K.*—*L. æmula* Brackenridge. Woods, Glynhir, *Ley*, *R. C. Rep.* 1884, 26; Pumpsaint, *K.* sp.

Phegopteris Dryopteris Fée. Upper Towy Valley, *B.*—*P. calcarea* Fée. Carn-yr-ogof, above Landdersat, *K.* sp.

Lycopodium Selago L. and *L. alpinum* L. Near Ystrad-ffin, *K.* sp.—*L. clavatum*. Near Convil, *B.*, 104. All these species of *Lycopodium* are frequent on the hills about Llandovery, *Selago* being less common than the other two, *K.*

The following species have been recorded for at least three of the counties of South Wales, but are at present not on record for

Carmarthenshire. They represent the following Watsonian types (B. = British, E. = English) :—

Ranunculus Lingua L. B.—*Fumaria pallidiflora* Jord. B.—*Cardamine impatiens* L. E. —*Hutchinsia petræa* R. Br. E. —*Cerastium semidecandrum* L. B.–E.—*Sagina ciliata* Fr. E.—*Hypericum hirsutum* L. B.–E.—*Myriophyllum spicatum* L. B.—*Epilobium roseum* Schreb. E.—*Silaus flavescens* Bernh. E.—*Senecio erucifolius* L. E.—*Hieracium murorum* L. pt. B.—*Centunculus minimus* L. E.–B.—*Galeopsis versicolor* Curt. S.–B.—*Polygonum Raii* Bab. B.—*Allium vineale* L. E.–B.—*Scilla verna* Huds. A.–S. ?—*Butomus umbellatus* L. E.—*Eleocharis acicularis* R. Br. E.–B.—*Schœnus nigricans* L. B.—*Cladium jamaicense* Crantz. B.—*Bromus commutatus* Schrad. B.

Others that have been found in from one to three counties :—

Cryptogamma crispa R. Br. H.—*Adiantum Capillus-Veneris* L. A.—*Equisetum hyemale* L. S.–B.

Mr. Barker* records forty Mosses and Hepatics, and Mr. Knight has a list of three hundred and seventy Mosses and Hepatics, but beyond that there seem to be few records of Cryptogams.

PEMBROKESHIRE HEPATICÆ.

By A. Brinkman.

The following is a list of the Hepatics, eighty in number, which I have noticed recently in Pembrokeshire. They are from three localities—St. Ishmael's, Prescelly, and Crymmych, which may be described as follows (they are indicated in the list by the initials I, P, and C.):—St. Ishmael's is a district on the north-west side of Milford Haven, comprising the parishes of St. Ishmael's, Dale, Marloes, St. Bride's, Talbenny, Hasguard, Walwyn Castle, Robeston, and Herbrandston. Highest point, 267 ft., ranging generally from 70 to 160 ft., divided by "bottoms" that reach sea-level, but usually ending in cliffs 70 to 150 ft. high. Geological formation, Old Red Sandstone throughout. Prescelly is subalpine, ranging from 600 to 1760 ft. (highest county point), districts worked being usually 900 ft. and over. A range of slate hills, stretching from the sea into Carmarthenshire, Prescelly being the few heights around Mynydd Prescelly from Fael Eryr to Carn Pica. Crymmych is further east of the same range, centring around Crymmych station from Fael Trigan to Freni Fawr and Llanfyrnach.

Riccia sorocarpa Bisch. I.
Conocephalum conicum Dum. I.
Lunularia cruciata Dum. I.
Marchantia polymorpha L. I.
Aneura pinguis Dum. C.—*A. multifida* Dum. I.

* *Natural History of Carmarthenshire*, 1905, 1175.

Metzgeria furcata Lindb. I., and var. *æruginosa* Hook. I.—*M. conjugata* Lindb. I.

Pellia endiviæfolia Dum. I.—*P. epiphylla* Dum. I.

Blasia pusilla L. C.

Fossombronia pusilla Dum. I.

Gymnomitrium crenulatum Gottsche. P.

Marsupella emarginata Dum. P., C., and var. *minor* Carr. C. —*M. aquatica* Schiffn. P.

Nardia scalaris Gray. P., C., I.—*N. hyalina* Carr. P.—*N. obovata* Carr. P.

Aplozia crenulata Dum. P., I., and var. *gracillima* (Sm.). I.—*A. riparia* Dum. C.—*A. pumila* Dum. C.

Lophozia inflata Howe. P.; var. *laxa* Nees. P.—*L. ventricosa* Dum. P., I.—*L. excisa* Dum. I.—*L. Floerkii* Schiffn. P. —*L. gracilis* Steph. P.

Plagiochila spinulosa Dum. P., I.—*P. asplenioides* Dum. I.; var. *major* Nees. I.; var. *Dillenii* Tayl. I.; var. *humilis* Lindb. I.; var. *heterophylla* Nees. I.

Lophocolea bidentata Dum. I.—*L. cuspidata* Limpr. P., I. —*L. spicata* Tayl. I.—*L. heterophylla* Dum. I.—*L. alata* Mitt. I.

Chiloscyphus polyanthos Corda. P., I.—*C. pallescens* Nees. I.

Saccogyna viticulosa Dum. I.

Cephalozia bicuspidata Dum. P., C., I.—*C. Lammersiana* Spruce. P.—*C. Francisci* Dum. P.

Prionolobus Turneri Schiffn. I.

Cephaloziella byssacea Warnst. P., I.—*C. bifida* Schiffn. I. —*C. stellulifera* Schiffn. I.—*C. Limprichtii* Warnst. I.

Kantia Trichomanis Gray. I.—*K. Sprengelii* Pears. I.—*K. arguta* Lindb. I.

Lepidozia reptans Dum. C.

Ptilidium ciliare Hampe. P.

Trichocolea tomentella Dum. Tenby.

Diplophyllum albicans Dum. P., C., I.

Scapania compacta Dum. I.—*S. gracilis* Kaal. P., C., I.—*S. nemorosa* Dum. P., I.; var. *uliginosa* Jensen. P.—*S. purpurascens* Tayl. P., C.—*S. undulata* Dum. P., C., I.—*S. paludosa* and var. *vogesiaca* C. Mull. C.—*S. irrigua* Dum. C.—*S. curta* Dum. I.

Radula complanata Dum. I.

Madotheca lævigata Dum. I.—*M. platyphylla* Dum. I.

Cololejeunea minutissima Schiffn. I.

Lejeunea cavifolia Lindb. I.; var. *heterophylla* Carr. I.—*L. patens* Lindb. I.

Marchesinia Mackaii Gray. I.

Frullania Tamarisci Dum. I.—*F. microphylla* Pears. I.—*F. fragilifolia* Tayl. I.—*F. germana* Tayl. I.—*F. dilatata* Dum. I.

Anthoceros lævis L. I.—*A. punctatus* L. I.

SHORT NOTES.

Euryale europæa.—In Verh. Kon. Akad. Wetensch. Amsterdam, deel xiii. No. 6 (Aug. 1907) we described, under the above name, a new fossil *Euryale* from Tegelen in Dutch Limburg. We now find that earlier in the same year Dr. C. A. Weber described a quite different new species of the same genus under the same specific name, his specimens having been obtained in an interglacial deposit in the province Kalugo, south of Moscow (see *Berich. Deutschen Bot. Gesellsch.* Band xxv, Heft 3. 23rd April, 1907). As Dr. Weber's species has priority, we substitute the name Euryale limburgensis for our Tegelen fossil.—C. & E. M. Reid.

Œcology of Montia fontana L. (Journ. Bot. 1907, 211, 282, 306, 452.)—Mr. West and Mr. Thompson (pp. 282, 452) say that *Montia fontana* never grows in bogs "properly so called." May I ask what their definition of a bog is? In most dictionaries and books of reference a bog is variously described as :—a marsh, a swamp, a marshy place, a swampy place; if the word "bog" has any other cryptic or obscure meaning I am ignorant of it, and would be happy to be enlightened. I agree with Miss Armitage in that I have never seen *Montia fontana* growing in a sphagnum bog, but then a sphagnum bog is a particular kind of bog, and as such, if meant, would naturally have been particularly alluded to in my note (p. 211). May I quote some references? :—1. "Marazion marsh in Cornwall," Withering, Nat. Arr. ed. 5 (1812), ii. p. 232. 2. "Boggy ground near the Wolfs-head turnpike-gate." . . . Leighton, Fl. Shropshire, 1841, p. 507. 3. "Bogs and wet sandy places," Pryor, Fl. Herts, 1887, p. 168. 4. "Boggy ground on Tuddenham heath," Skepper, Fl. Suffolk, 1866, p. 30. 5. "In wet boggy places," Dickinson, Fl. Liverpool, 1851, p. 54. 6. "Marshy spots," [Kane] Irish Flora, 1833, p. 27. 7. "Swamps." W. R. Linton, Fl. Derbyshire, 1903, p. 86. Miss Armitage's list (p. 306) of localities in which *Montia* grows is interesting. She also seems to have found it in bogs :—"in a bog, not on sphagnum, in Denbighshire, 900 ft." I might quote other localities :—1. "This plant and *Veronica Beccabunga* are troublesome weeds in many gardens in Donegal," Hart, Fl. Donegal, 1898, p. 132. 2. ". . . on damp sandy ground, moist fallows, etc." Bromfield, Fl. Vectensis, 1856, p. 183. 3. "Springs, watery lanes, wet ploughed lands. Wet heaths in Norfolk," Withering, *l.c.* 4. "Damp woods, marshy heaths, streams and ditches," Bagnall, Fl. Warwickshire, 1891, p. 41. I have not, however, found *Montia* in such localities on the Quantock Hills, and it was only to this district that my note (p. 211) referred.—L. A. Riley.

NOTICE OF BOOK.

Comparative Electro-Physiology; a Physico-Physiological Study. By JAGADIS CHUNDER BOSE. Pp. 760. With Illustrations. Longmans, Green & Co. 1907. Price 15*s*.

To review this work in the sense of giving a critical, detailed account of its subject-matter is beyond our power. Professor Bose possesses such fertility of imagination, and covers such a vast amount of ground, that the panting physiologist toils after him in vain. If but one-half, or even one-quarter, of the conclusions arrived at in the present volume survive the test of verification, Professor Bose will be known to future generations of physiologists as the founder of their science, and names such as Sachs and Pfeffer will mean no more to them than Theophrastus or Albertus Magnus mean to us.

According to Professor Bose, the modern view of stimulus is all wrong; the "trigger and rifle" metaphor is exploded; and stimuli themselves supply the energy for the reactions they invoke. Professor Bose apparently regards the exploitation by the plant of radiant energy in photosynthesis as a solar myth, since he asks, If plants do not derive energy from stimuli, whence *do* they get it?

The volume covers, as already indicated, a vast range of subjects. It starts with an investigation of the molecular responses of matter, and of the electromotive response of plants; passes on to consider the leaf as an electric organ; gives an account of the response of animal and vegetal skins, glands, and digestive organs—discovers incidentally that sapwood is not dead—deals with the absorption of food by plants; treats of the ascent of sap; inquires into geotropism; determines the velocity of transmission of excitation; investigates the response of "isolated vegetal nerve," and after researches in many other matters of equal or greater importance, considers the physical basis of sensation and offers views on memory.

As to the permanent value of many of the conclusions which Professor Bose draws from his investigations it is premature to speak.

The only effective criticism is that to be made in the laboratory. It is however possible, by choosing a particular example and considering it critically, to form some idea of the value of the method of an experimenter. This we will do in the case of a single experiment: that of which an account is given on pp. 352–354. The author is dealing with the absorption of food by the plant. Having referred to the excretion of CO_2, and the absorption of dissolved salts by the root, Professor Bose proceeds to inquire whether the reactions of the root are or are not similar to those of digestive organs in general. He has convinced himself previously that in digestive organs (of animals) there are two opposite activities of secretion and absorption. As a preliminary—and

this is the particular experiment we wish to scrutinize—Professor Bose describes a new mode of demonstrating root-secretion. The experiment is as follows:—A *Colocasia* plant, lifted from a marshy soil, was placed in water in order to remove the earth from the roots. It was kept overnight with its roots in *normal saline solution*, which he states was slowly absorbed. In the morning the plant was washed to remove the salt. A young root was now immersed in dilute silver nitrate. On passing tentanising shocks through the plant, the immersed root became excited and secreted its contained salt solution, this being seen in the silver nitrate as streams of white precipitate.

This may be an admirable mode of demonstrating root-secretion, but before we adopt it for class or other purposes, we require to know: (1) What happened to the root-hairs when they were placed in water? Did they burst? (2) What happened to the root-hairs when they were transferred to normal saline? (3) Does *Colocasia* normally contain any appreciable quantity of sodium chloride? (4) Are not the cells of the root killed by dilute silver nitrate? (5) Would the same result have been obtained if the roots had *not* been put previously in normal saline and if *no* electric current had been passed through the plant? The impression left on the reader's mind in this case—and it is typical—is that the experiment cannot bear the weight of the conclusion.

Nevertheless we welcome Professor Bose's book, and commend it heartily to the critical, to those who are in search of subjects for investigation, and to all who can appreciate delightful ingenuity displayed in devising methods and in designing apparatus. The form, print, and illustrations of the book are worthy of the high reputation of the publishers.

FREDERICK KEEBLE.

BOOK-NOTES, NEWS, &c.

AT the meeting of the Linnean Society on 6th February, 1908, a paper was read by Mr. Clement Reid, on "Fruits and Seeds from the Pre-glacial Beds of Britain and the Netherlands," especially on the Pakefield specimens from the neighbourhood of Lowestoft (Cromer Forest-bed), and from Tegelen, near Venloo, in the province of Limburg, Netherlands. The substance of his observations has been published in the *Verhandelingen* of the Amsterdam Academy and the *Journal of the Linnean Society*, xxxviii. (1908), pp. 206-227. A paper by Mr. S. T. Dunn, on "A Botanical Expedition to Central Fokien," was laid before the meeting by the general secretary. The author stated that in April, May, and June, 1905, a botanical expedition was undertaken, with three native collectors and one Chinese herbarium assistant, to the centre of the province of Fokien. The difficult journey from Foochoo to Yenping was successfully accomplished, and

enough stores deposited at that town to enable a large collection of plants to be made. The central portion of this province, which is as large as England and Wales combined, had never previously been visited by a botanist, and, as might be expected, a considerable number of novelties were discovered, and are here described, amounting to at least forty new species.

Lieut.-General Sir Richard Strachey, whose death has been lately announced, was born in 1817. He entered the E.I.C. Engineers in 1836, and his connection with botany is limited to the important collection made with James Edward Winterbottom in 1848–9, of which the following account is given in Hooker and Thomson's *Flora Indica*, p. 65 (1855): "The collection distributed by Captain Strachey and Mr. Winterbottom consists chiefly of the plants of Kumaon and Garhwal, and of those of the adjacent parts of Tibet. Captain Richard Strachey was appointed by the Indian Government to make a scientific survey of the province of Kumaon, and was occupied on the task about two years, during which time, in addition to the important investigations in physical science which occupied his attention, he thoroughly explored the flora of the province, carefully noting the range of each species. He was joined by Mr. Winterbottom in 1848, and they travelled together in Tibet. Their joint collections, amounting to 2000 species, were distributed, in 1852–3, to the Hookerian Herbarium, the British Museum, the Linnean Society, and some foreign museums; and the scientific results are now in course of publication. The beautiful preservation of the specimens, and the fullness and accuracy with which they are ticketed, render this herbarium the most valuable for its size that has ever been distributed from India; and we beg here to record our sense of the great benefit that has been rendered to botanical science by the disinterested labours of these indefatigable and accomplished collectors."

We have received the new (tenth) edition of the *London Catalogue of British Plants* and Mr. Druce's *List of British Plants*, notices of which will appear in our next issue. Mr. Druce has left England on a voyage round the world; he expects to return in June.

The thirteenth annual issue of *One and All Gardening* (92 Long Acre, W.C.) presents, like its predecessors, a medley of useful and interesting matter, abundantly illustrated. It is largely written by Mr. D. S. Fish, who should know how to spell Edelweiss before he writes about it. There is a suggestive and readable paper on "Garden Teaching in Schools," by Mr. H. J. Wright, which should be useful to those engaged in education, and a compilation on "British Medicinal Plants," by the Hon. H. A. Stanhope, which we cannot think can be useful to anybody. But it is a wonderful two pennyworth.

The South-Eastern Agricultural College at Wye in Kent have issued a Report on Economic Mycology, edited by Mr. E. S. Salmon. Fruit is very largely cultivated in the county, and when

disease gets into the orchards great loss is caused, as the conditions are favourable to the rapid dissemination of fungus spores. Mr. Salmon deals in his Report with two of those fungus diseases that have already caused serious damage: Cherry-leaf Scorch (*Gnomonia erythrostoma*) and Apple Scab or "Black Spot" (*Fusicladium dendriticum*). As a remedy for these he recommends spraying with Bordeaux mixture, which kills the fungus without injuring the fruit-trees. The attention of farmers is called to a fungus that forms galls on the crown of lucerne plants, completely checking all growth of leaves; it has been reported as yet only from the south-eastern districts. A large part of the Report is devoted to a consideration of the American Gooseberry Mildew. We have already commented on Mr. Salmon's praiseworthy efforts to rouse the country and the Government to a sense of the loss that will be caused if this disease is not stamped out before it has time to spread. Growers will not destroy their affected bushes unless they are compelled to do so, and any orders to be effectual must be universal. Various half-hearted recommendations have already been issued, but nothing drastic enough, Mr. Salmon considers, to meet the needs of the case. We again wish him all success in his struggles with Government Boards. Another pamphlet is devoted to the description of a potato disease which has appeared in this county within the last ten years. It forms black scabs on the tubers, completely destroying them, and is caused by a fungus (*Chrysophlyctis endobiotica*) which has sometimes been erroneously determined as *Œdomyces leproides*, a totally different fungus. The disease is spreading widely in Scotland and the North of England, and again Mr. Salmon pleads for Government interference. The various papers are well illustrated by photographic reproductions.—A. L. S.

We have received a prospectus of *A Survey and Record of Woolwich and West Kent*, which is to be published, apparently at an early date, at 4*s.* net; subscriptions to be sent to Mr. Alexander Thomas, Town Hall, Woolwich. The Botany Section is under the editorship of Messrs. J. F. Bevis and W. H. Griffin; the flowering plants are undertaken by these gentlemen, aided by Messrs. R. H. Chandler, C. H. Grinling, and W. Williams; the cryptogams by Messrs. Rudolf Beer and E. M. Holmes, in addition to Messrs. Williams and Bevis: "Selected records from all available published sources have been incorporated both for flowering-plants and cryptogams." We should like to have some assurance that the flowering plant records have been supervised by some botanical expert, as the names of those who have undertaken them are unfamiliar to British botanists.

We regret to record the death of our contributor Mr. John Benbow, who died on Feb. 10 at Uxbridge, within a month of his eighty-seventh birthday.

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BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

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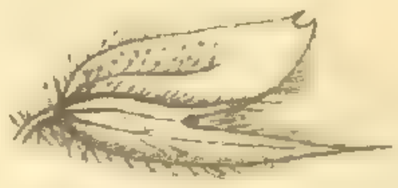

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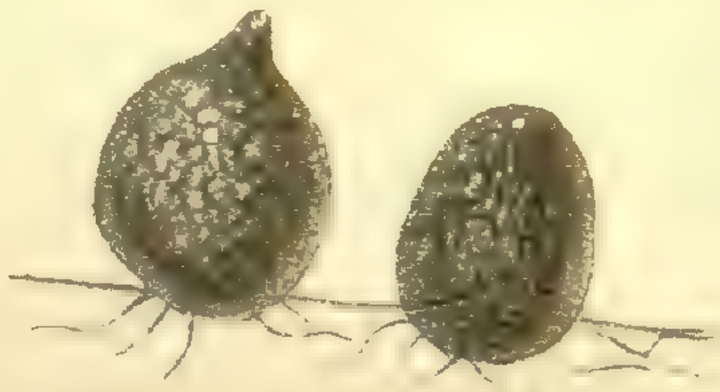

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THE FORMS OF *SALVIA VERBENACA* L.

By H. W. Pugsley, B.A.

(Plate 489 B.)

My attention having been drawn some years ago to Babington's Lizard record for *Salvia clandestina*, it occurred to me, when preparing some notes in anticipation of the Cornish holiday of June, 1902, in which *Fumaria occidentalis* was discovered, to include the *Salvia* in my list of desiderata; and shortly afterwards, when I had arrived at the Lizard, a day's walk on the east side of the peninsula resulted in the finding of a large-flowered Sage, which I felt satisfied was the plant that had attracted the notice of Babington in 1839. This conclusion was based on the descriptions in the British Floras, which, though not in complete agreement, sufficiently indicated a plant with more conspicuous flowers than appear in the ordinary Wild Clary.

The specimens thus collected were not further examined until the winter of 1905, when, in view of the remarks on *S. clandestina* in Mr. F. H. Davey's *Tentative List of Cornish Plants*, I thought it desirable, before again recording this species for the Lizard, to confirm its identity at the British Museum. A reference to the National Herbarium and the library there speedily showed that the Lizard plant was not the original *S. clandestina* of Linnæus, and also that many forms had been described allied to this plant and to *S. Verbenaca*. The arrangement of these forms by different authors varied, however, so considerably that, although some of them closely resembled my Lizard specimens, I was unable to settle on a satisfactory name, and was thus led, in spite of some reluctance to enter on the criticism of such a complex and difficult genus as *Salvia*, to pursue the question further and to consider at the same time the plant recorded as *S. clandestina* from Guernsey, and the other British forms of *S. Verbenaca*.

S. Verbenaca L. was published in *Species Plantarum*, 25 (1753), and between that date and 1831 I find no fewer than ten other specific names for plants more or less closely akin, before considering which it may be well to recall the salient features of the Common Clary familiar to English botanists.

This is a coarse, robust plant, a foot or two high and but slightly branched, with lax racemes of verticillate flowers and a persistent spreading rosette of dark green, wrinkled, radical leaves, oval or ovate in outline, and more or less sinuate or pinnatifid, with serrate-crenate lobes. The cauline leaves, as distinguished from the bracts, are generally restricted to two or three pairs, the uppermost being often very broad, irregularly cut and drawn out to an acuminate point. The upper part of the stem, which in a varying degree is hairy and glandular, is tinted, unless in shade, with dull purple, and this colour also suffusing the relatively large calyx, which further increases in size after flowering, a prevalent dark tone is imparted to the inflorescence, which obscures the

purplish blue of the seemingly disproportionately small corollas. The flowers are thus rendered inconspicuous, and so form a marked contrast to those of the other British species *S. pratensis*.

In *Species Plantarum*, ed. 1, 25 (1753), *S. Verbenaca* is described by Linnæus as "S. foliis serratis sinuatis corollis calyce angustioribus," three figures being quoted: two from Barrelier's *Plantæ per Galliam etc. observatæ* (ic. 208 and ic. 220), and one from Triumfetti's *Observ.* 66 (t. 66).

In the second edition, p. 35 (1762), the diagnosis is revised by the addition of "læviusculis" after "sinuatis," the Barrelier ic. 220 being transferred to a new species, *S. clandestina*. It is noteworthy that the two remaining figures, which are again quoted under *S. Verbenaca*, represent a slender plant with relatively narrow, deeply-cut leaves, and fairly large corollas, arched in the upper lip; in Barrelier's work ic. 208 this is described as "Horminum sylvestre minus, inciso folio, flore azureo," while of its flowers it is remarked in the text, "Flores cærulei modò, modò cæruleo-violacei, nunc albi."

In the Linnean Herbarium *S. Verbenaca* is represented by two sheets, both showing cultivated plants from the Botanical Garden at Upsala. The first of these has a slender, light-coloured stem and very narrow leaves (about 8 cm. long by 3 cm. broad), the lower deeply sinuate-dentate. Its flowers, both as to calyx and corolla, the latter of which appears deep blue, are quite small and possibly abnormal, owing to the cultivation of the plant from which the specimen was taken. The second example, gathered later, perhaps, and showing no corollas, has good fruiting calyces and differs essentially from the first only in its deeper and more irregular leaf-cutting.

The resemblance of these specimens to the plants figured by Barrelier and Triumfetti is unmistakable, and when this is considered in conjunction with Linnæus's brief diagnosis, it becomes evident that the form primarily intended as *S. Verbenaca* is a plant characterized by a somewhat slender habit with narrow and deeply-cut foliage.

The description of *S. clandestina* (*Sp. Pl.* ed. 2, 36) is fortunately much more precise, and runs as follows, *viz.*:—"Habitat in Italiâ. Caules . . . villosi . . . spithamæi . . . Folia oblonga, pinnato-sinuata, rugosissima, crenata . . . in caule 2 s. 3 paribus . . . calyces pilis glutinosis . . . corolla violacea, vix calyce duplo longior; labii inferioris medio lobo albo."

The figure quoted by Linnæus: "Horminum sylvestre, inciso folio, cæsio flore, italicum" (Barr. ic. 220) agrees closely with this description, depicting a dwarf plant with large rootstock and stem barely exceeding in length the pinnatipartite radical leaves. As Mr. Druce remarks (*Journ. Bot.* 1906, p. 406), in all probability no doubts would have arisen as to the identity of this plant had it not been represented in the Linnean Herbarium by the Eastern species since identified with *S. lanigera* Poir. (= *S. controversa* Benth. non Ten.) but described in Sibthorp and Smith's *Flora Græca* from Linnæus's specimen as *S. clandestina* L.

In 1788 another name for a plant of this group, *S. horminoides*, was published by Pourret (*Mém. Acad. Toul.* iii. 327). This was diagnosed, "Caulescens, foliis oblongis, repandis, crenatis; calycibus coloratis, corollæ labiis approximatis, longitudine æqualibus, pistillo incluso," and was said to be intermediate between *S. Verbenaca* and *S. virgata* Jacq., and to be abundant around Narbonne. It seems to be a taller plant than the two preceding, with spreading and less divided leaves, a coloured calyx, and the corolla differing in form from that shown in Barrelier's figures. A specimen labelled by Pourret showing fairly broad leaves was seen by M. Briquet in Allioni's herbarium.

Ten years later Savi (*Flora Pisana*, 22) described as *S. pratensis minor* a fresh form from Pisa resembling *S. pratensis*, but differing in size, in the radical leaves, and in the corolla. In Savi's *Bot. Etrusc.* i. 21 (1806) this is identified with *S. clandestina* L. but in Loiseleur's *Notice*, 6 (1810) it is redescribed as a distinct species, under the name of *S. præcox* Savi, *Fl. Pis.*, and as such has been quoted by subsequent authors. It is said not to exceed five inches in height, with deeply toothed and sinuate leaves and light blue flowers, characters which recall *S. clandestina* and Barrelier's figure, ic. 220.

Another *Salvia* of this group is *S. verbenacoides* Brotero, *Fl. Lusit.* i. 17 (1804). Its principal features are " . . . foliis cordato-oblongis, crenatis, subsinuatis aut pinnatifidis, rugosis . . . media inter *S. clandestinam* et *Verbenacam* L. an earum varietas?" and it is divided into the following four varieties, which, however, are not nominally distinguished:—

Var. α. Corollæ labiis remotis.
" β. Corollâ eâdem, spica acuta.
" γ. Corollæ labiis approximatis.
" δ. Corolla alba.

It will be noticed that this is the first species in which variations of the corolla are thus diagnosed.

A further species, *S. oblongata*, was published in 1805 in Vahl's *Enumeratio*, i. 256. This was separated from *S. Verbenaca* by its foliage, the leaves being lanceolate-oblong and obtuse, with large, equal, crenate-serrate teeth. The author remarks: "Salvia betonicæfolia . . . affinis *S. Verbenacæ*, an modo varietas? differt foliis non sinuatis, æqualiter profunde serratis," and mentions that the flowers are of small size, with a blue corolla as in *S. Verbenaca*.

The *Flora Græca* of Sibthorp and Smith, i. 16 (1806) furnishes the next name to be considered, viz., *S. multifida*. This is described as "S. foliis cordatis multifidis incisis glabris caule folioso simplici, . . ." and Barrelier's "Horminum sylvestre," &c., ic. 220, formerly quoted by Linnæus for *S. clandestina* is printed as a synonym. The accompanying plate (tab. 23) depicts a dwarf *Salvia* with much-cut leaves that certainly resembles *S. clandestina* L., *S. præcox* Savi, and the plant figured by Barrelier, and from this and the citation of Barrelier, *S. multifida* has been generally accepted as identical with them by subsequent botanists.

An essential difference, however, seems to have been neglected, for in the figure of Sibthorp's plant, which came from the neighbourhood of Constantinople, the upper lip of the calyx is shown as broadly truncate, with distant and diverging spinescent teeth—a feature (emphasized in the detailed description "calycis dentes superiores haud fastigiati") so different from the type of calyx found in *S. Verbenaca* and its allies as apparently to place *S. multifida* in quite another section of the genus. So far as I am aware, the National Herbarium contains no specimen of *S. multifida* showing this peculiar form of calyx, and as in a fragment preserved there, labelled "Constantinople, Dr. Sibthorp," the ordinary calyx of *S. Verbenaca* is distinguishable, it would seem doubtful whether such a plant as that depicted in the *Flora Græca* really exists. This discrepancy was noticed by Bentham, who remarks in the *Labiatæ* that he had seen specimens from Sibthorp showing the ordinary calyx of *S. Verbenaca*. In these circumstances it seems inadvisable to retain *S. multifida* as a member of the *Verbenaca* group.

In 1809 a new name, *S. polymorpha*, was substituted for *S. verbenacoides* Brot., in Hoffmansegg and Link's *Flore Portugaise*, i. 149, where a further description of the species is inserted as follows, *viz.*:—"Caulis plerumque spithamæus, interdum pedalis . . . Foliis . . . summis sessilibus, ovalibus, cordatis, incisis, acuminatis . . . corollâ calycem longe superante, compressâ, cæruleâ, labii lobo medio albo. . . ." Like Brotero's species, on which it is founded, this too has three varieties besides the type. The first, var. *acutata*, is distinguished by a more acute spike, more deeply cut leaves, and the corolla wholly blue. The second, var. *parviflora*, has the corolla barely exceeding the calyx and with included stamens, and is said to differ from *S. Verbenaca* in the cordate and much broader upper leaves. The third var., *elatior*, is characterized chiefly by its stature. It is observed by the authors, as a reason for uniting these different-looking plants as varieties of a single species, that from seeds of the var. *parviflora* large-flowered forms have been produced. The description is supplemented by an excellent figure (tab. 19) of the typical plant, which is not unlike *S. clandestina* L., but branched and more luxuriant, with broad, characteristic, cauline leaves. Sketches of the corollas of the large- and small-flowered varieties are also included.

A plant found near Agen, in the Valley of the Garonne, was next published as a species in St. Amans' *Flore Agenaise*, 10 (1821) under the name of *S. pallidiflora*. This is diagnosed: 'Tiges d'un à trois pieds de haut . . . feuilles ovales-oblongues . . . les radicales obtuses, dentées, crénelées, puis sinuées-pinnatifides. Corolle plus ample et deux fois plus longue que le calice, d'un gris de lin (bleu cendré) ou d'un pourpre clair, la lèvre supérieure très peu arquée . . . la lèvre inférieure à trois lobes, celui du milieu . . . avec deux tâches blanches à la gorge . . . Notre plante a la plus grande affinité avec les *S. Verbenaca* et *clandestina*, L."

As a synonym for this species St. Amans gives Barrelier's "Horminum minus, Betonicæ folio, flore purpureo," ic. 167, a tall plant with leaves broader, more spreading, and less divided than those in the figures quoted by Linnæus for *S. Verbenaca* and *S. clandestina*.

In 1831 two more specific names appeared for Salvias related to this group, *viz.*, *S. controversa* and *S. collina*. The first of these, *S. controversa*, was published in Tenore's *Syll. Fl. Neap.* 18, and the plant, gathered in Calabria, is described as "foliis pinnatifido-linearibus serratis rugosissimis revolutis, caulibus foliosis, corollis calycibus hirsutissimis triplo longioribus, galea stricta subfalcata . . ." The second species, *S. collina*, was introduced in Lowe's *Primitiæ Floræ Maderæ*, &c., 18, as "S. caule herbaceo, visco-piloso; foliis pinnatifidis, incisis vel subsinuatis, dentatis, venosis, glabris . . . corollis calycem duplo superantibus; galeâ falcatâ, compressâ," the author suggesting that his plant is the same as *S. verbenacoides* and *S. polymorpha*.

This series of specific names was shortly afterwards dealt with by Bentham (*Labiat. gen. et spec.* 239 sq. 1832–6), who identifies *S. controversa* Ten. with the *S. clandestina* of the *Flora Græca* and the Linnean Herbarium (now referred to *S. lanigera* Poir.), and recognizes two other species, the *S. Verbenaca* and *S. clandestina* of the *Species Plantarum*. In this work *S. horminoides* Pourr., and *S. oblongata* Vahl. are reduced to synonyms of *S. Verbenaca*, while the remaining six species already alluded to are referred to *S. clandestina*.

The type of *S. Verbenaca* is described as "foliis late ovatis oblongisve crenatis . . . corollis calyce dimidio longioribus galeâ rectâ vel subfalcatâ," and two varieties are created, *viz.*:—

β. *oblongifolia*. Foliis oblongis crenatis vix incisis.

γ. *incisa*. Foliis late ovatis incisis, lobis ovatis acutis approximatis maximè affinis est *S. clandestinæ*, cui forsan referenda.

The second species, *S. clandestina*, is diagnosed: "foliis ovato-oblongis inciso-dentatis, pinnatifidisve . . . corollis calyce duplo longioribus galeâ subfalcatâ. Planta quam maximè variabilis hinc *S. Verbenacæ* illinc *S. controversæ* affinis. Folia sæpius angustiora, magis dissecta, prope basin caulis approximata, statura humilior, racemus densior . . . specimina tamen occurrunt inter hanc et *S. Verbenacam* media . . . corolla nonnunquam ut in *S. controversâ* semiabortiva calyce brevior," and a variety is added, *viz.*:—

β. *multifida*. Foliis profunde inciso-pinnatifidis lobis ovato-oblongis.

The notable features of this combination, besides the reduction in the number of species, seem to be a general extension of the definition of *S. clandestina* and a restriction of the name of *S. Verbenaca* to forms with but slightly divided leaves, whether narrow or broad in outline.

This classification reappears in De Candolle's *Prodromus*, xii. 294 (1848) with the addition, under *S. clandestina*, of a second variety—

γ. *angustifolia.* Racemorum axi pilosissimo, calycibus pilosiusculis.

Another arrangement, also recognizing two distinct species, appeared in 1850 in Grenier & Godron's *Flore de France.* In this Flora *S. Verbenaca* is described as "corolle petite, à peine plus longue que le calice, d'un pourpre clair et uniforme . . . feuilles crénelées ou lobées-crénelées . . . plante de 2–4 décim. à odeur faible," while the other species, *S. horminoides* Pourr. (= *S. multifida* Sibth. & Sm. = *S. pallidiflora* St. Am.) is distinguished as "corolle une fois plus longue que le calice, . . . à lèvre inférieure, à lobe moyen grand, blanc . . . feuilles . . . lancéolées-oblongues, incisées-crénelées ou incisées-pinnatifides . . . plante de 2–6 décim. à odeur désagréable." It will be observed that the first of these descriptions seems to fit a plant akin to that commonly met with in Britain, while the second includes, with taller forms, the *S. clandestina* of the *Species Plantarum.*

The third edition of Boreau's *Flore du Centre de la France* (1857) likewise shows the same two species, but adopts the name of *S. pallidiflora* St. Am. for the second in place of *S. horminoides* Pourr. The account of this plant, it may be remarked, is somewhat different from the earlier descriptions, its important points being—"Plante . . . à odeur forte . . . feuilles d'un vert clair, incisées-crénelées ou pinnatifides . . . corolle d'un bleu clair, une fois plus longue que le calice, à lèvre supérieure . . . courbée en faux dès la base." No mention is made of a white lower lip to the corolla.

In 1870 an entirely new departure was made in Jordan & Fourreau's *Icones Fl. Europ.* ii. pp. 17–19, where the Salvias of the *Verbenaca-clandestina* group are formed into a new genus, *Gallitrichum.* Under this generic name the authors describe and figure a number of species, relying for distinction on the variations of foliage, hair-clothing and development of glands, form of calyx, and shape and colouring of the corolla. The majority of the species thus described are large-flowered forms indigenous in France. Two of them, with narrow, deeply-cut leaves, very pilose calyces and large pale blue corollas, with the lower lip entirely white, recall the *S. clandestina* L. A third, *G. pallidiflorum*, from Agen, is stated to be the *S. pallidiflora* of St. Amans. This is shown with narrow, deeply crenate-dentate leaves, of a light green, the calyx bearing comparatively few glands but many pilose hairs, and the corolla, which has divergent lips, the upper long and arched, being wholly blue in colour both within and without. This last character is emphasized in the text, "corolla . . . fauce immaculato." A form from Toulon, *G. arvale*, seems to differ from *G. pallidiflorum* chiefly in the broader foliage. A special interest for us attaches to another species, *G. anglicum*, in that it is founded on specimens from Wembury, South Devon. This is a form with broad, deep green leaves, numerous glands on the calyx, and corollas not unlike those of *G. pallidiflorum* in size and shape, but of a purple colour, with two white spots in the throat, at the base of the lower lip. One species, *G. rubellum*

has reddish corollas, with connivent lips scarcely exceeding the calyx. The genus *Gallitrichum* does not appear to have been retained by recent authors.

In Parlatore's *Flora Italiana*, 256 (1883) the whole of these forms are combined under a single species, *S. Verbenaca* L. Two varieties, however, are recognized—

α. *vulgaris*. Elatior, foliis minus divisis, corollâ minore purpureo-violaceâ.

β. *australis*. Humilior, foliis majus divisis, corollâ majore lilacinâ—

and among the synonyms quoted for the latter are *S. clandestina* L. ?, *S. multifida* Sibth. & Sm., and *S. controversa* Ten.

The next author to deal with this group seems to be Mons. J. Briquet, of Geneva, from whom we get, in 1891, in *Les Labiées des Alpes Maritimes*, a more elaborate account than any that had yet been published. In this treatise the writer draws particular attention to the polymorphism of the corolla, a feature which, as already seen, had been detected by Hoffmansegg & Link, and alluded to, under *S. clandestina*, in Bentham's *Labiatæ* and De Candolle's *Prodromus*. As M. Briquet's conclusions on this subject seem to be of importance, I have freely translated them *in extenso*.

He says, under *Salvia* (p. 490): "Several species produce female flowers with small corolla, style much exserted, and stamens much reduced. In others again there exist very small flowers, more or less perfectly cleistogamous, the corolla being almost closed and self-fertilization normally taking place through the meeting of the anthers and the stigmatic lobes. Every intermediate stage between these different states may be found in one and the same species."

And, again, under *S. Verbenaca* (pp. 510, sq.), he continues:— "This species contains a series of varieties difficult to classify satisfactorily owing to the polymorphism of the corolla. While in some places plants with large, proterandrous flowers are alone met with, in others nothing can be found but the same form with flowers more or less cleistogamous; and often the different states grow intermingled.

"As in any one variety every form of corolla may occur, from the large, proterandrous flower to the small, cleistogamous one, we describe the two extreme states and the intermediate. 1. Corolla large, exceeding the throat of the calyx by 13 mm.; tube cylindrical for 3–4 mm., then somewhat contracted below and swelling into a spacious throat 5 mm. long; upper lip 8–9 mm. long, arched-falcate, but less so than in *S. pratensis*; lower lip 8 mm. long, spreading-deflexed, with the lateral lobes rounded-erect, and the middle one first shortly contracted and then spreading into a broad lip. Anther-lobe 2 mm. and connective about 10 mm. long. 2. Corolla intermediate, exceeding the calyx-throat by 7–8 mm.; upper lip 5 mm. long and less falcate than in preceding; lower lip about 4 mm. long; connective reduced to 5 mm. 3. Flowers more or less cleistogamous. The whole corolla

5–7 mm. long; tube more or less cylindrical for 2 mm., then contracted below and prolonged in a throat 2 mm. long; upper lip convex, 2·5–3 mm. long; lower lip concave, 3 mm. long. Upper and lower lips conniving, more or less closed; sexual organs enclosed, the branches of the style resting against the stamens, of which the connective is further reduced to 3 mm. in length.

"The large, proterandrous flowers are frequented by honey-bees and humble-bees, and fertilized in a similar way to those of *S. pratensis*, while the smaller intermediate flowers are visited by honey-bees only, and the abortive, more or less cleistogamous ones, which are not proterandrous, are regularly self-fertilized. It may be noticed that the allogamous flowers are most prevalent in summer, and that later in the season the cleistogamous forms predominate."

On account of these variations in the corolla, M. Briquet, in classifying the different plants of the group, largely ignores the floral characters, and relies mainly on those afforded by the foliage, uniting all the forms under one species, *S. Verbenaca* L., thus:—

1. Subsp. VERBENACA. Leaves generally oblong, cut into lobes not reaching one-third of the distance from the margin to the midrib.
   - α. v. *oblongata* (= *S. oblongata* Vahl). Leaves regularly crenate-serrate.
   - β. v. *Verbenaca* (= *S. Verbenaca* L. Sp. Pl. ed. 2, sensu stricto). Leaves more deeply and irregularly sinuate-crenelate.
   - γ. v. *amplifrons*. Leaves as in var. β, but broader, ovate-elliptic in outline.
2. Subsp. CLANDESTINA. Leaves ovate or oblong in outline, pinnatilobed, with lobes reaching about a third of the way to the midrib.
   - δ. v. *clandestina* (= *S. clandestina* L. Sp. Pl. ed. 2, pp. = *S. præcox* Savi = *S. pallidiflora* St. Am. = *S. horminoides* Gr. & God.). Leaves oblong, elongate.
   - ε. v. *horminoides* (= *S. horminoides* Pourr.). Leaves ovate, broad.
3. Subsp. MULTIFIDA. Leaves oblong-elongate or ovate, cut nearly to the midrib.
   - ζ. v. *controversa* (= *S. controversa* Ten. non Benth.). Leaves oblong-elongate, with distant lobes.
   - η. v. *multifida* Vis. (= *S. multifida* Sibth. & Sm.). Leaves broadly ovate.

The descriptions of these subspecies and varieties are annotated with observations that they all pass so imperceptibly into one another that any attempt to regard them as distinct species would be absolutely fallacious. It may be remarked that, in addition to ignoring the form of the corolla, M. Briquet neglects also its colouring, and no mention is made of the differences of scent arising from the varying development of the glands.

Since the publication of *Les Labiées des Alpes Maritimes*, another fresh arrangement has appeared in the recent *Flore de France* (iii. 102) by l'Abbé Coste, who makes no allusion to the polymorphic flowers beyond admitting some variation in the size of the corolla, and distinguishes three species—*S. clandestina* L., *S. Verbenaca* L., and *S. horminoides* Pourr.

The main features of this latest diagnosis are as follows:—

"S. CLANDESTINA L. (= *S. multifida* Sibth.). Plante de 8–30 cm. . . . odorante . . . feuilles profondément incisées ou pennatifides; corolle de 10–15 mm., d'un bleu pâle avec le lobe médian inférieur blanchâtre, à lèvre supérieure comprimée et courbée en faux.

S. VERBENACA L. Plante de 10–50 cm., assez grêle . . . odorante . . . feuilles oblongues, larges de 2–3 cm. crénelées ou incisées-lobées . . . corolle de 10–15 mm., d'un bleu violet . . . à lèvres assez écartées, la supérieure un peu arquée au sommet, non comprimée.

S. HORMINOIDES Pourr. non Gren. & Godr. Plante de 30–80 cm., robuste . . . peu odorante . . . feuilles ovales-oblongues, larges de 3–6 cm., pennatilobées . . . corolle de 5–10 cm., d'un bleu violet, à lèvres rapprochées, presque égales . . . la supérieure presque droite, non comprimée, style inclus."

It will be seen from these numerous descriptions that a large number of plants exists more or less closely allied to *S. Verbenaca*, with which most of them, when described as species, were directly or indirectly compared. The characters whereby they were differentiated were taken commonly from the foliage and the form and colour of the corolla, although other features, such as the habit of the plant, were in some cases also considered. In height these Salvias are said to vary from three or four inches to about three feet, the stem being either simple or with several branches. The leaf-cutting may be crenate-serrate, as in *S. oblongata* Vahl, or linear-pinnatifid, as in *S. controversa* Ten., the blade being of any breadth from lanceolate almost to orbicular. Similar fluctuations may be traced in the size and shape of the corolla, while its colour seems to pass from purple through shades of blue to pale grey or lilac, with white spots appearing at the base of the lower lip in some forms and extending in others completely over the middle lobe.

On the other hand, no essential differences are set forth in the hair-clothing or the calyx of any of these forms, with the exception of *S. multifida* Sibth. & Sm., the description of which it has already been suggested has been based on a misconception.

This relative uniformity therefore, in contrast to the extreme variableness of the leaf-cutting and corolla, would seem to indicate that the types of hair-clothing and of calyx must be relied on as the best characteristics of the group.

In all of these plants, while the upper leaf-surface is glabrous, except rarely for a very few scattered hairs on the uppermost cauline leaves, the stem is more or less abundantly clothed with a

whitish pubescence of curled, often deflexed, hairs of short or medium length, which are also found on the petioles, and sometimes extend along the under side of the midrib and the lateral veins of the radical leaves. On the higher part of the stem, especially on the inflorescence, a greater or less number of stalked glands and of spreading pilose hairs is usually intermingled with the shorter pubescence, the long hairs occasionally occurring right down to the rootstock.

The most characteristic feature, however, is undoubtedly the calyx. This is relatively large, its tube, as recorded by M. Briquet, being 4 mm. long, with the broad upper lip 3 mm., and the bidentate lower one 5 mm. in length. These dimensions are not constantly reached in the dwarfer forms, in which the teeth generally show rather less development than in the taller plants, but they are sometimes exceeded when the calyx has become enlarged in fruit, the extreme length in one of my specimens being over 11 mm. The spinous teeth of both lips, together with their strong nerves and coriaceous texture, are very remarkable after the period of flowering; but the calyx-hairs are still more so, and furnish the most important character of the *Verbenaca* group. This character is the presence of a number of long, whitish, pilose hairs, resembling those of the stem, which abound on the pedicels, occur in numbers on the calyx, especially on the lower side, and are conspicuously abundant round the interlabial sinuses. In addition to these hairs some stalked glands may also be seen, and these predominate along the nerves of the upper lip.

This pilosity of the calyx readily separates these plants from the small-flowered forms of *S. pratensis* L., in which it is absent, and replaced by a comparatively short pubescence. *S. pratensis* is further distinguished, not only by the glandular upper lip of the corolla but by the less strongly-nerved and coriaceous calyx, with teeth less spinous and upper lip more recurved. A more uniform pubescence, too, not only clothes the stem and petioles, but covers the under leaf-surfaces, and some of the hairs being glandular, a distinct scent is imparted to the foliage, which in the *Verbenaca* forms is wanting.

(To be concluded.)

NOTE ON *BARBAREA STRICTA* ANDRZ.

By T. A. SPRAGUE & J. HUTCHINSON.

(PLATE 489 C.)

THE object of the present note is to draw attention to some little-known characters of *Barbarea stricta*, and to record what we have ascertained as to its distribution. The material examined included the dried specimens preserved at Kew and the British Museum, besides numerous living plants observed on the banks of the Thames and its tributaries in Middlesex and Surrey.

Perhaps the best distinguishing mark of *B. stricta* is the presence of spreading hairs at the apex of the sepals; the hairs are most conspicuous on the buds, and give an unexpanded inflorescence quite a misty appearance, which contrasts sharply with the clearly defined outlines of an inflorescence of *B. vulgaris* in the same stage. The character appears to be constant, but seems to have been overlooked except by A. G. Blytt (Norges Flora, p. 969 (1876), Haandbog, p. 365 (1904)) and Oborny (Flora von Mähren u. österr. Schlesien, p. 1182).

Other good distinctions between the two species in a living state are that the petals of *B. stricta* are suberect, or at most only patulous, whereas those of *B. vulgaris* are at first spreading, and finally become more or less reflexed, as has been briefly noted by Mr. J. G. Baker (Journ. Bot. 1871, 213), who mentioned also the deeper colour of the petals in *B. stricta*; and that the foliage and stems of *B. stricta* are yellow-green, whereas those of *B. vulgaris* are of a deep green colour. Finally, the inflorescence of *B. stricta* is much more corymbose than that of *B. vulgaris*.

The following supplementary diagnoses have been drawn up from the living plants:—

B. VULGARIS R. Br. Buds glabrous. Sepals 3–4 mm. long. Petals narrowly obovate, more or less distinctly retuse, 5·5–7 mm. long, 2–3 mm. broad, yellow with a whitish claw, at first spreading, finally more or less reflexed.

B. STRICTA Andrz. Buds hairy at apex. Sepals 2·5–3 (rarely 4) mm. long. Petals oblong-spathulate, rounded, truncate or obscurely retuse, 3·5–5 mm. long, 1–1·5 mm. broad, yellow all over, ascending, the posticous ones at length patulous.

Although it is an easy matter to identify *B. stricta* in the living state, the determination of herbarium material is quite another matter, as the differences in colour and in the direction of the petals can no longer be observed, and the hairs on the sepals tend to fall off, or to be rubbed off. Hence we have had to rely entirely in some cases on such characters as the shape of the leaves and nature of the infructescence, which, though often decisive, are insufficient for the determination of certain specimens.

With the exception of a single specimen from Japan and two from Canada, we have seen no extra-European material of *B. stricta*. The Japanese specimen, which we cannot identify with certainty, owing to the imperfect preservation of the flowers, was collected at Sapporo, Prov. Ishikari, Hokkaido, and was communicated to Kew in May, 1893, by Dr. Kingo Miyabe; it is mounted on the right-hand side of the sheet, whilst on the left there is a specimen of a *Barbarea* sent with it under the same label (*Barbarea vulgaris* R. Br. var. *stricta* Regel), but evidently not *B. stricta*, judging from the nature of the inflorescence. The Canadian specimens (*Macoun*, No. 7, Sault Ste. Marie, Lake Superior, in Herb. Kew., and Red Deer Lake, N.-W. T., in Herb. Mus. Brit.) have all the appearance of typical *B. stricta*, and

although the flowers are not sufficiently well preserved for absolute certainty, there seems to be no reason for doubting the correctness of Macoun's determination.* On the other hand, there seems to be some misconception as to *B. stricta* in the United States, if the figure given by Britton and Brown (Illustr. Fl. N.U.S. ii. 122, f. 1710 (1897) represents what is generally taken for *B. stricta* by American botanists. The large spreading petals shown in the figure, the relatively lax, less appressed pods, and the large lateral lobes of the leaves are all incompatible with *B. stricta*. We can hardly venture, however, to determine the species figured.

In Europe *B. stricta* is widely distributed, and has been recorded from the following countries:—*England*, *Scotland*, Norway, *Sweden*, Denmark, Holland, Belgium, France, *Germany*, *Switzerland*, Italy, *Austria*, *Russia*, Bosnia, and Bulgaria. [Italics indicate that we have seen a specimen from the country in question.]

It occurs well within the Arctic Circle, the most northern records being Kola (nearly 69° N.) and Lumbovski in Russian Lapland, given by Fellman (Pl. Vasc. Lapp. 7 (1864–9)); while there are specimens at Kew from Quickjock, in Swedish Lapland, and Ponoj, in Russian Lapland, both of which are only a little further south. The western limit in Europe is in Britain, the eastern in the Russian provinces of Orenburg and Perm (Korshinsky, Tent. Fl. Ross. Or. 30 (1898)), the southern in Bosnia and Bulgaria.

Its occurrence in France, Belgium, and Italy is doubtful. Rouy and Foucaud (Fl. France, i. 199 (1893)) state that they have never seen *B. stricta* Andrz. from France, although it has been recorded from several French localities, owing to confusion, however, with *B. rivularis* Martr.

Crépin (Bull. Soc. Bot. Belg. ii. (1863) 257) seems to have been the first to record *B. stricta* from Belgium, but a few years later (Man. Fl. Belg. ed. 2, 46 (1866)) he suggested that the Belgian plant might be identical with *B. rivularis* Martr.; and the latest workers, De Wildeman and Durand (Prodr. Fl. Belg. iii. 308 (1899)), leave the matter in doubt.

According to Caruel (Fl. Ital. ix. 853 (1893)), *B. stricta*, which he treats as a variety of *B. vulgaris*, occurs in northern and middle Italy. He remarks, however, that although the fruiting raceme of the variety has a very distinct aspect, there is no other difference between it and typical *B. vulgaris*, and it seems probable, therefore, that the Italian "var. *stricta*" is not identical with *B. stricta* Andrz., but is a mere form of *B. vulgaris*.

The occurrence of *B. stricta* in Bosnia and Bulgaria rests on Velenovsky's record (Fl. Bulgar. 24 (1891)); we have seen no specimens from either country.

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* *B. vulgaris* R. Br. var. *stricta* Regel, quoted from numerous Canadian localities in Macoun, *Catalogue of Canadian Plants*, i. p. 45 (1883).

The following account of the distribution of *B. stricta* in Britain is contributed by Mr. A. B. Jackson :—

"Although widely distributed, *B. stricta* is a very local species. It was first recorded as a British plant in 1843, when Mr. Borrer found it between Sheffield and Halifax, Yorks, and between Weedon and Blisworth, Northants. In the latter county it appears to have occurred only as a casual. Specimens from the original localities are preserved in Mr. Borrer's herbarium and the general herbarium at Kew. It was subsequently gathered by Mr. J. G. Baker on the banks of the Ouse, near Clifton, Ings, and in other localities about York, and later, by the same botanist, by the Thames in Surrey, where it still grows associated with the commoner species *B. vulgaris*, but apparently no intermediate states have been found. From an ecological standpoint it is interesting to note that the two species also grow together in Yorkshire and Herefordshire. A consultation of local floras and specimens at the British Museum and Kew shows the following distribution of *B. stricta* in Britain:—Surrey*, Essex, Middlesex*, Suffolk, Northampton* (casual), Gloucester, Hereford*, Worcester, Warwick (casual), Lincoln*, Cheshire, North-east Yorkshire*, and Stirling*. It is not possible now to test the accuracy of all these records, but I have seen authentic specimens from the counties starred.

"Watson and others have questioned the claims of *B. stricta* to be considered an indigenous plant in Britain, presumably from the fact that it occurs by canals and riversides where ballast may have been thrown; but after going carefully into the question of its distribution on the Continent, where its habitats are much the same as in England, I can see no good reason why it should not be given the same status as *B. vulgaris*, which is found under similar conditions. There is no definite evidence of its introduction in many of the stations from which it has been recorded in Britain, and, until such evidence is forthcoming, it cannot be held that the case for its rejection as a native species has been satisfactorily made out."

EXPLANATION OF PLATE 489*c*.—1. *Barbarea vulgaris*, flower and petal; 2. *B. stricta*, flower, flower-bud, and petal.

A NEW VARIETY OF *SAGINA REUTERI*.

BY W. INGHAM, B.A., & J. A. WHELDON, F.L.S.

(PLATE 489 D.)

Sagina Reuteri has been hitherto regarded as a native of Spain, and when first detected in Britain, owing to the suspicious nature of the first few stations whence it was reported, was looked upon as an alien of accidental introduction from the South of Europe. Its discovery recently by one of us (W. Ingham) on

Skipwith Common in Yorkshire* points to the probability, almost to the certainty, of its being a native British plant. In the original description by Boissier (Diagn. Pl. Orient. ser. ii. 1, 82), and in Willkomm's Descr. Plant. Nov. Crit. Hisp. i. 114, t. 73 A, and Prodr. Flor. Hisp. iii. 602, the only locality given is "near Madrid," where it was found by Reuter in 1841. No other South European locality seems to be known, and in a letter to one of us Mr. F. N. Williams states :—"I have every reason to believe that this original and only locality in S.W. Europe marks the plant as an alien, and that it is truly native further north, having been probably passed over as not quite typical *S. apetala*. I have received for examination so many specimens of *S. Reuteri* from the North of England, and from inland localities, as to preclude the idea that it has been imported from Spain. I am quite prepared to reverse the early view of the habitat of this plant, and now hold that it is a casual or alien in its original and only station 'near Madrid,' and a native of more northern countries." Mr. Williams further suggests the unlikelihood of *S. Reuteri* having reached Yorkshire from either Spain or over the Pennine Hills from Lancashire. As further strengthening this view it is interesting to note that the Lancashire plant differs in certain respects from that of Yorkshire. There is no specimen in Herb. Kew, either from Spain or anywhere else; but there is an example of the var. *peduncularis*, mentioned by Willkomm (from Malaga), which Mr. Williams, after careful examination, refers definitely to *S. maritima*.

The second recorded European station for *S. Reuteri*, and the first for Britain, appears to be that of Capt. J. A. H. Steuart—"on the railway platform, Great Malvern, Worcester, August 8th 1892" (Bot. Exch. Club Rep. for 1892 (1893), p. 358). In a note in the same Report Mr. Druce refers to similar specimens collected by himself in Northamptonshire. In their edition of Babington's *Manual*, Messrs. Groves, who place it as a variety of *S. apetala*, extend its distribution to Herefordshire and Pembrokeshire. To these must be added the following stations from examples in Herb. Wheldon :—Redcar, N. Yorks, July, 1868, *J. G. Baker*; Birkenhead, Cheshire, July, 1902, *J. A. Wheldon* (*vide* Bot. Exch. Club Rep. 1902, p. 38); Walton, near Liverpool, S. Lancs, 1906; near Preston Docks, 1906 (Fl. W. Lancs); and near Morecambe, W. Lancs, 1906, *J. A. Wheldon*. The specimens from all the above localities, except three which we have not seen, are more or less glandular-setose, some exceedingly so. In this respect they agree with Boissier's specimens, which are described as being "parce glanduloso-puberula."

The plants recently discovered in Yorkshire (Skipwith Common, *W. Ingham*), as also similar plants from Strensall Common, *J. A. Wheldon*, are entirely eglandular. It would seem therefore that there are two forms of this species, analogous to such similar parallel and nearly related forms as *Arenaria serpyllifolia* L. and *A. viscida* Lois., and to *Sagina nodosa* Fenzl and *S. glandulosa*

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* See Journ. Bot. 1907, 413, where "Portuguese" should read "Spanish."

Bess. We distinguish the Yorkshire plant as a variety by the following characters :—

Sagina Reuteri var. glabra. Omnino eglanduloso-glabra. Folia basi scarioso-marginata haud ciliata. Flores sæpius inclinati. Capsula inclinata, calyce tertiâ parte longior. Semina minuta nitidula bruneola. Plantula ad 4 cm. alt. plerumque autem humilior. . . Folia superiora ± 0·4 cm. F. inferiora 1·15–1·25 cm. long. Capsula 0·15–0·2 cm. long. Pedunculi 0·3–0·85 cm. vel ultra.

Hab. Supra terram turfaceam sabulosam in locis ericetis. In Anglia septentrionali raro videtur : ut apud Skipwith Common (*W. Ingham*) et Strensall Common (*J. A. Wheldon*) in comitatu Eboracensi.

S. Reuteri is readily distinguished from *S. maritima* by its texture and longer capsules ; from *S. apetala* by its erect sepals and shorter peduncles ; from *S. ciliata* by its obtuse sepals and their incurved tips ; and from *S. procumbens* by its central stem always elongating and flowering. Its associates on Skipwith Common were all native species, including such plants as *Mentha Pulegium*, *Apium nodiflorum* var. *repens*, *Limosella*, *Veronica scutellata* var. *hirsuta*, and *Riccia crystallina*. Its discovery in such a situation, and the subsequent finding of specimens from another Common in the same county (put away as *S. apetala*) point to the fact that *S. Reuteri* has been hitherto overlooked, and to the probability of its being a truly native species, most likely of frequent occurrence on the damp sandy commons of Yorkshire, and in similar situations in other counties. The variety *glabra* occurs in rather densely tufted patches of a vivid green colour, and the ripe capsules seem to be invariably nodding. In this solitary character it shows some approach to *S. procumbens*. There does not seem to be any likelihood of its being a hybrid between *S. procumbens* and *S. apetala*, although the first-named occurs on both Strensall and Skipwith Commons. The seed is freely produced, and although very minute seems to be plump and properly developed. We hope to grow it on in the coming spring.

We are greatly indebted to Mr. F. N. Williams for much help in drawing up this account, and for identifying the original specimens from Skipwith Common.

[Localities for *S. Reuteri* additional to those cited above will be found in this Journal for 1896, 367, where Mr. Towndrow records it from a railway station at Worcester ; for 1897, 409, where the same botanist announces it as occurring on garden paths at Tedstone Delamere, Herefordshire ; and for 1906, 12, where Mr. C. E. Salmon gives two West Sussex localities. Specimens from these three places are in the National Herbarium, authenticated in the case of the last by Mr. Williams. See also Journ. Bot. 1896, 427, where Mr. Williams includes it in his List of British *Caryophyllaceæ*.—Ed. Journ. Bot.]

Plate 489 c.—1. *Sagina Reuteri* var. *glabra* (Skipwith Common). Twice natural size. 2. Capsule and leaf of same, enlarged. 3. *S. Reuteri* (Great Malvern, Capt. J. A. H. Steuart). Capsule and leaf, enlarged.

THE SECTIONS OF *GEISSASPIS*.

By Edmund G. Baker, F.L.S.

The genus *Geissaspis*, founded by Wight and Arnott (Prod. p. 217 (1831)), is allied to *Zornia* and *Smithia*, but differs from the typical species of these genera in having large generally orbicular bracts hiding or almost hiding the flowers. The original species, *G. cristata* W. & A., came from Courtallum and Malabar, but for many years the genus included three species, two Indian and the third from Senegambia. In 1897 M. Micheli described and figured (Bull. Soc. Bot. Belg. xxxvi. 2, 58, t. 3) a very interesting species, *G. bifoliolata*, from the Congo, which differs in structure in certain important particulars from the original members of the genus. It is for this plant and its allies, some of which have been described in the Section *Kotschya* of the genus *Smithia*, that I venture to propose a new section, *Bracteolaria*, characterized by the presence of bracteoles at the apex of the pedicel.

Sect. I. Eugeissaspis.

Bracteæ amplæ oblique reniformes vel suborbiculares venosæ flores fructusque sæpius obtegentes nunc ciliatæ nunc integerrimæ. Bracteolæ 0.

* Gorgonea et Africana.

Bracteæ oblique reniformes margine integerrimæ flores omnino obtegentes . . . . . 1. *G. psittacorhyncha* Taub.

** Asiaticæ.

a. Bracteæ oblique reniformes margine ciliatæ flores omnino obtegentes . . . . . 2. *G. cristata* W. & A.

β. Bracteæ quam precedentes minores margine subspinosæ vel spinoso-ciliatæ oblique oblongæ vel ovato-oblongæ sæpius flores vix omnino obtegentes . . . . . 3. *G. tenella* Benth.

Sect. II. Bracteolaria.

Bracteæ amplæ late suborbiculares vel suborbiculari-obovatæ apice sæpius emarginatæ vel bilobatæ flores fructusque sæpius obtegentes. Bracteolæ 2 calycis tubo appressæ.

Rami patentim pilosi. Folia unijuga. Foliola obovata obtusa ex icon. et descript. 4. *G. bifoliolata* Micheli. (Congo Region.)

Rami subglabri vel extremitates versus pilis brevibus tecti. Folia unijuga. Foliola valde obliqua obovata vel suborbiculari-obovata 9–14 mm. longa.

5. *G. emarginata* Harms. (Uhehe and Lake Nyasa.)

Rami subglabri vel extremitates versus pilis patentibus tecti. Folia 1–2-juga. Foliola valde obliqua obovata vel suborbiculari-obovata 2·0–2·5 cm. longa.

6. *G. drepanocephala* Baker. (British Central Africa.)

Rami breviter pilosi. Folia 2-juga. Foliola obovata obtusa 11–13 cm. longa ex descript.

7. *G. Descampsii* De Wild. & Durand. (Congo Region.)

Rami fere glabri. Folia 3-4-juga. Foliola oblonga vel subobovato-oblonga 9–21 mm. longa.

8. *G. Welwitschii* (Taub.). (Angola.)

Rami fere glabri. Folia 3–4-juga. Foliola oblique obovato-oblonga 3·0-4·5 cm. longa. 9. *G. Gossweileri* Bak. fil. (Angola.)

Rami tomento rubro-farinaceo tecti. Folia 4–5-juga. Foliola oblique obovato-oblonga apice subtruncata leviter emarginata.

10. *G. rubro-farinacea* (Taub.). (Central African Lake Region.)

Rami superiores pilis ferrugineis dense obsiti. Folia 4–9-juga. Foliola oblique oblonga vel obovato-oblonga ± 3 cm. longa.

11. *G. megalophylla* (Harms). (Angola.)

1. G. PSITTACORHYNCHA Taub. in Engler & Prantl Naturl. Pflanzenfam. iii. 3, 321 (1894).

G. lupulina Planch. ex Benth. in Trans. Linn. Soc. xxv. 298 (1865).

Sœmmeringia psittacorhyncha Webb, Spic. Gorgon. 123 (1849).

Hab. UPPER GUINEA. Sierra Leone! Senegambia! Cape Verde Islands.

5. G. EMARGINATA Harms in Engler Jahrb. xxviii. 405.

Hab. MOZAMBIQUE DISTRICT. Uhehe, Mt. Ukano, *Goetze*, n. 687! Lower Plateau, north of Lake Nyasa, *Thomson*!

8. G. WELWITSCHII comb. nov.

Damapana Welwitschii Hiern in Cat. Welw. Afr. Pl. i. 238.

Smithia Welwitschii Taub. in Engler Jahrb. xxiii. 19.

Hab. Angola. Huilla, *Welwitsch*, n. 2141! Princeza Amelia, Kubango, *J. Gossweiler*, n. 3862!

9. **G. Gossweileri**, sp. nov. Suffrutex cortice atro-purpurascente tectus et longitudinaliter striatus sec. cl. detectorem superne ramosus; foliis pro genere maximis in speciminibus mihi obviis 3–4-jugis foliolis oppositis subsessilibus oblique obovato-oblongis coriaceis glabris apice rotundatis nervis in postica folioli parte 6–7 e basi folioli ortis costa excentrica; rhachi fere glabra; racemis pedunculatis; bracteis sessilibus flores pallide sulphureo-flavos subobtegentes ambitu late orbiculatis apice emarginatis (lobis obtusis subrotundatis) margine integris vel hinc inde pilis brevibus tenuibus basi dilatatis obsitis basi subcordatis, bracteolis ad apicem pedicelli lanceolatis vel ovato-lanceolatis margine pilis brevibus basi dilatatis obsitis; calyce alte bilabiato dentibus superioribus 2 inferioribus 3; vexillo basi unguiculato lamina obovato-oblonga basi in auriculas breves producta; carina basi unguiculata; ovario molliter pilosulo 1–2 ovulato basi disco cupulari subcarnosulo cincto, stylo superne glabro, legumine immaturo.

Species ad *G. megalophyllam* accedens differt foliolis majoribus nervis in postica folioli parte 6–7 tenuibus, bracteis margine glabris vel hinc inde pilis brevibus obsitis, bracteolis ad apicem pedicelli lanceolatis.

Hab. Common at Kaconda. In flower Feb. 1907; *J. Gossweiler*, n. 3833!

"A suffruticose undershrub, total height 5 ft. Stem branched towards the top, leaves somewhat glaucous green, bracts pale

green, corolla pale sulphur-yellow. Here and there in herb-grown woods and thickets."

Foliola 3·0–4·5 cm. longa, 2·5–2·8 cm. lata. Bracteæ 1·8–2·0 cm. longæ. Bracteolæ lanceolatæ ± 6 mm. longæ. Calyx ± 1·2 cm. longus. Carina ± 9 mm. longa.

10. G. RUBROFARINACEA comb. nov.

Smithia rubrofarinacea Taub. in Pflanzenwelt Ost.-Afr. C. 216 (1895).

Hab. Central African Lake Region. Ukomo, *Stuhlmann*. Stevenson Road, *Scott Elliot*, nn. 8284! and 8305! Nyika Plateau, *Maclounie*, n. 159!

11. G. MEGALOPHYLLA comb. nov.

Smithia megalophylla Harms in Engler Jahrb. xxvi. 292 (1899).

Hab. Angola. Huilla, *Antunes*, n. 94. On the Longa, *Baum*, n. 706!

THE AFFINITIES OF *PÆONIA*.

By W. C. Worsdell, F.L.S.

Being at present engaged in a detailed study of the vascular anatomy of the *Ranunculaceæ*, *Magnoliaceæ*, and other allied orders belonging to Engler's *Ranales*, I have been struck, as doubtless many another has been before me, with the fact that the vascular anatomy of the leaf and axis of *Pæonia*, which genus has been, and still is, persistently placed by sytematists in the *Ranunculaceæ* (one of the most unnatural of "natural" orders) is wholly unlike that of other members of this group; on the other hand, it bears a most evident resemblance to that of *Magnoliaceæ* and *Calycanthaceæ* and even, in some respects, to that of *Anonaceæ*. As regards the structure of the individual vascular bundle, whether it be found in leaf or axis, there is in *Pæonia*, as in *Magnoliaceæ*, &c., a complete absence of any tendency towards an amphivasal concentric structure, *i. e.* with central phloem and peripheral xylem, which is so marked a feature in *Ranunculaceæ*. On the contrary, the whole tendency is towards the precisely opposite type of structure, *viz.* the periphloic, *i. e.* with central xylem and peripheral phloem. It is true that in the structure of the petiole of *Helleborus* we see a slight link with that of *Pæonia* in the fact that the bundles are often arched, *i. e.* tend towards a periphloic structure, and the end-bundles of the petiolar arc are sometimes quite concentric (periphloic) in structure, just as in the case of some of the lateral bundles in *Pæonia*. But in the *stem* the amphivasal tendency of *Ranunculaceæ* is again manifest. A glance at a transverse section of the peduncle of either *Pæonia*, *Magnoliaceæ* or *Calycanthaceæ* is enough to convince us that an essentially identical structure prevails in each case, *viz.* a central cylinder, with no such marked tendency towards a scattered arrangement of its constituent bundles as we see in *Ranunculaceæ*,

and a system of cortical *concentric* (*i. e.* periphloic) bundles, which are entirely absent in the latter group. From a consideration of the character of the vascular anatomy alone I am sure that no one would ever dream of classing *Pæonia* with the *Ranunculaceæ*; on the other hand, a very fair case could be made out for classing the genus with the *Magnoliaceæ*. I am prepared to go even further, and to say that so marked is the anatomical affinity with *Magnoliaceæ*, and so profound the difference from *Ranunculaceæ*, that these traits could not possibly coexist side by side with any proximate affinity to *Ranunculaceæ* as regards the *ensemble* of the *other* characters of the plant; in view of the fact as to the vascular structure, the remaining characters are bound to exhibit the genus as being either closely allied to *Magnoliaceæ* and, perhaps, *Calycanthaceæ*, or else intermediate between these orders and *Ranunculaceæ*; and this, I think, we find to be indeed the case.

In considering the external organs of the plant we will begin with the *foliage-leaves*. The almost universal tendency in the *Ranunculaceæ* is towards subdivision of the comparatively large leaf into more or less narrow lobes. In the *Magnoliaceæ* and *Calycanthaceæ* the leaves are large but simple; never subdivided. The leaves of *Pæonia* appear to me to be intermediate in character between these two sets of orders; they share with *Ranunculaceæ* the subdivided leaf, and with the *Magnoliaceæ*, &c., the large laminar area and fleshy texture. Once more, however, we see a connecting link with the *Ranunculaceæ* in the genus *Helleborus*, which has leaves allied in configuration and development with those of *Pæonia*, i. e. it combines the two characters of subdivision of the leaf and considerable laminar development. In the structure of the stomates and subsidiary cells *Pæonia* resembles *Ranunculaceæ* much more than *Magnoliaceæ*, &c. The absence of stipules is a feature common to *Ranunculaceæ* and certain genera of *Magnoliaceæ*.

Let us now approach a study of the flower. The manner in which the bracts pass imperceptibly into the sepals in *Pæonia* reminds one at once of the same phenomenon in *Calycanthaceæ*, while in *Ranunculaceæ* such a transition, except in abnormal cases, *e. g.* in *Anemone*, is unknown, a sharp distinction always prevailing between bracts and sepals. In *Calycanthaceæ* the transition between the two organs is very gradual; in *Pæonia* it is much less gradual, and hence this latter genus is intermediate in this respect between the two extreme cases. The spiral arrangement of the sepals on the axis occurs in *Ranunculaceæ*, certain *Magnoliaceæ*, e. g. *Illicieæ*, *Schizandreæ*, and *Calycanthaceæ*. The *large gaudy* corolla of *Pæonia* is undoubtedly much more of a magnoliaceous than a ranunculaceous character, the latter being rather nectar- or staminode-like than petaloid. On the other hand, the 5–10-merous, one- to two-whorled character of the corolla in *Pæonia* constitutes an approach to *Ranunculaceæ*, for in *Magnoliaceæ* the corolla is usually 3-merous and possesses as a rule more than two whorls or cycles.

The androecium, with its indefinitely and spirally arranged numerous stamens, is practically identical in all these groups; hence I

need not dwell upon it. As regards the gynœcium, *Pæonia* has 2–3 large follicular carpels arranged, of course, in a single whorl, and bearing along each margin a number of large red or black seeds. In *Ranunculaceæ* a very similar gynœcium obtains in several of the genera, e. g. *Helleborus*, *Nigella*, *Delphinium*; other genera have the carpels arranged on an elongated receptacle. In certain *Magnoliaceæ*, e. g. the *Illicieæ*, the carpels are few in number and arranged in a whorl on a scarcely-elongated receptacle; in other genera they are more numerous and occur on a much-elongated receptacle, as in *Magnoliaceæ*. In their follicular shape the carpels of *Pæonia* appear to me to approach those of *Ranunculaceæ*; in texture, however, they resemble, perhaps, those of *Magnoliaceæ* more closely.

The seeds of *Pæonia* and *Magnoliaceæ* are large and often of a bright red colour; they possess a copious endosperm, which is rich in oil. The seeds of *Ranunculaceæ* are not so large, nor so brightly coloured; those of some genera, e. g. *Trollius*, contain an oily endosperm; others, e. g. *Nigella*, appear to be devoid of oil.

To sum up: the characters of *Pæonia*, apart from those of the vascular anatomy, are clearly at all points intermediate between those of *Ranunculaceæ* on the one hand and those of *Magnoliaceæ* and *Calycanthaceæ* on the other. If we consider *all* the characters, including those of the vascular anatomy, I certainly think that the trend of relationship is emphatically in the direction of *Magnoliaceæ* rather than in that of *Ranunculaceæ*.

And yet *Pæonia* in the *tout ensemble* of its characters and in the general aspect of the plant inevitably gives one the impression of something distinct and apart from any of these other and allied orders, perhaps in a somewhat similar way as *Magnoliaceæ* stand apart from *Anonaceæ*, or both from *Calycanthaceæ*. Hence, I have decided, not without due weighing of the conducive evidence, to treat of the genus *Pæonia* (in an anatomical paper which I hope shortly to contribute to a contemporary journal) as constituting a *separate and independent natural order* of plants, *viz.* the *Pæoniaceæ*. To my mind, its present inclusion in the *Ranunculaceæ* (and perhaps the same may be said of one or two other genera, e. g. *Hydrastis*) is quite without justification in reason. By whomsoever this inclusion was effected, *all* the characters of the plant were certainly not at the time taken into account. On the other hand, it differs too much from all members of the *Magnoliaceæ* to justify its inclusion in *that* order. It is thus entitled to be regarded as a group apart.

THE "WITCHES' BROOMS" OF THE SOUTH MIDLANDS.

By James Saunders, A.L.S.

Naturalists who are making observations on the diseases of trees, particularly the cases in which the malformations known as "Witches' Brooms" are developed, may find the following list of service for comparison with similar data from other districts.

The species enumerated have been noticed within a radius of ten or twelve miles of Luton, an area which includes parts of the adjoining counties of Beds and Herts.

The records have been made during a period of five years preceding the close of 1907. It is not suggested that the list is exhaustive, but it is at least fairly representative of the subject as exhibited in the district under consideration. In most cases the exciting cause is a parasitic fungus, while in exceptional instances colonies of insect pests, phytophagi (*Eriophyes*), act as irritants and induce the abnormal growths. Of the latter, two cases are here recorded, in both of which the brooms were developed on the main stem; these are on hornbeam near Luton, and on beech at Chaul End. Birch-trees are also liable to disease from both these causes, but at present that due to a fungus has only been observed in this district.

The presence of parasitic fungi affects the general health of trees in widely different degrees. In birch, hornbeam, and hawthorn, although they may bear any number of brooms, often fifty or more, the trees appear to maintain their normal vigour, and although the diseased portions are usually barren, the other parts produce a full crop of fruits. In cherry, both the wild and cultivated forms, the disease produces great ravages, frequently large limbs are destroyed, and in extreme cases the entire organism perishes. At Harpenden, within a hundred yards of the western end of the experimental grass-plots in Rothamstead Park, there is a grove of wild cherry-trees which, in different individuals, exhibit every stage of the disease. In cherry-orchards, such as that at Top Street Farm, Harpenden, the fruit-bearing capacity of the trees is seriously diminished.

The phenomena associated with the growth of the brooms are, usually, crumpling of the foliage, barrenness, and brevity of life of the twigs. The leaves fall at an early period; in the case of the common elm, several weeks before the healthy foliage. In cherry and hornbeam the leaves on the brooms exhibit rich crimson hues of various shades through the whole summer, and fall in the early autumn. The twigs live for only one or two seasons, dying down to near the base, at which point a leaf-bud starts a new growth, so that these brooms contain numerous dead twigs and comparatively few living ones, hence their opaque appearance.

In many trees, notably beeches, an excessive development of weak branches is produced at the base of the trunk, an abnormal growth probably associated with the disease known as "gnarling."

In the following list the parasite, where known, is mentioned; in several cases examples were not observed till the autumn of the current year (1907), too late for the inspection of the foliage, and in others, as *Pinus*, the brooms were at too high an elevation to obtain material for microscopic examination. In the compilation of the names of the parasitic fungi I have to gratefully acknowledge the assistance of Dr. W. G. Smith, of the Yorkshire College, Leeds.

Lime (*Tilia vulgaris* Hayne). Rare. Woodside.

Wild Cherry (*Prunus Avium* L.). The groups of asci are visible, with a lens, on the under side of the leaves. The fungus is *Exoascus* (*Taphrina*) *Cerasi* Sadeb. Abundant on clay soils.

Cultivated Cherry (*Prunus Cerasus* L.). The asci are evident on the under surface of the leaves in June and July. *Exoascus Cerasi* Sadeb. (*E. deformans β Cerasi* Fückel). Frequent.

Hawthorn (*Cratægus Oxyacantha* L. var. *monogyna*). Branching of brooms sometimes dense and tortuous, at others elongate and ascending. The leaves exhibit numerous brown patches in May and June, with which the asci are associated. *Exoascus Cratægi* Fückel (*Taphrina Cratægi* Sadeb.). Occasional.

Elder (*Sambucus nigra* L.). One example only. Very rare. Round Green, near Luton.

Common Elm (*Ulmus campestris* Sm.). In June and July the leaves are marked with brown spots, on which are numerous asci containing elongate spores. Doubtfully referred to *Taphrina Ulmi* Johan (*Exoascus Ulmi* Fückel). Rare. Limbury, Stockwood, Wheathamstead.

Wych Elm (*Ulmus montana* Sm.). Rare. Stockwood, Luton.

Birch (*Betula alba* L., agg.). The fruiting stage appears on the under side of the leaves in May and June. The brooms occasionally bear catkins, which are also attacked by the fungus *Exoascus betulinus* Rostr. (*E. turgidus* Sadeb.). This disease is distinct from another to which these trees are subject. In this the leaves are infested by minute mites, *Eriophyes rudis* Canestrini, the irritation set up by them causing diminutive brooms to appear as outgrowths from the diseased buds (see *Country Life*, May, 1904). This is confirmed by Mr. E. Connold, the author of a work on British Galls. Frequent.

Oak (*Quercus pedunculata* Ehrh.). Rare. Luton Hoo.

Beech (*Fagus sylvatica* L.). A dense growth of weak branches on the main stem just below the principal branches was observed on a tree at Chaul End. As the leaves were swarming with mites, they were probably the proximate cause of the abnormal development. Rare. Chaul End.

Hazel (*Corylus Avellana* L.). The leaves in July show brown patches, containing asci, the spores being ovoid and minutely dotted, probably the fruiting stage of an *Exoascus*. Rare. Chaul End.

Hornbeam (*Carpinus Betulus* L.). The brooms on hornbeam, if one may judge by those that occur in this neighbourhood, are occasioned by two distinct causes. Those on the general branch system being due to the presence of a fungus (*Exoascus*), and those on the main stem to mites (*Eriophyes*). The latter are rare in this district, the former are abundant. An examination of the foliage of the broom on a trunk in mid-summer will usually reveal swarms of mites of various sizes. The asci of the brooms on the branches may be observed on the leaves in June and July. The spores are brown, ovoid, nearly smooth, measuring about 6 by 9 μ.

Taphrina Carpinus Rostr. (*Exoascus Carpini* Rostr.). Frequent both over the chalk and lower greensand areas.

Pine (*Pinus sylvestris* L.). Two examples observed in Woburn Woods, so elevated as to be inaccessible. Near Baldock. Mr. Fordham.

Larch (*Larix europæa* DC.). One example; also seen in Woburn Woods.

Spruce Fir (*Abies excelsa* Poir.). Two trees at least of this species which bear brooms are present in South Beds, one in Luton Hoo Park, and the other near Caddington. In both the growth is very dense, the branches are abbreviated, the leaves more crowded and spreading than in the type. The normal foliage measures 13 to 14 mm. in length, the diseased from 8 to 10 mm. The leaves show a number of dark spots, evidently the fruiting stage of a fungus. In transverse sections of the leaves, prepared by Mr. W. H. Burrell, F.L.S., the mycelium threads are visible, some of which are knotted and twisted, apparently in their efforts to force a passage through the stomata. In reference to these Tubeuf remarks: "*Æcidium coruscans* forms malformed shoots in spruce." Kerner says: "Witches' brooms also occur on pines, larches, and spruce firs, &c., although hitherto we have not been able to ascertain definitely what parasitic fungi are the causes of these cases." Rare. Luton Hoo, Woodside.

MIDDLESEX POTAMOGETONS.

As unrecorded localities for this county are always of interest, owing to the growth of London, &c., I give the following:—

Potamogeton polygonifolius Pourr. Hounslow Heath. *Herb. Sherard*!

P. perfoliatus Lackney M. Harsh. June, 1797, *Herb. Salt* (at Sheffield).

P. obtusifolius Mert. & Koch. Paddington. Sept. 9th, 1837, *W. Wilson* in Cambridge Herb.!

P. acutifolius Link. Pond on Staines Moor, July 19th, 1879. *H. Groves.* This is a state of the plant with peduncles 1½ in. long and leaves rather more apiculate than usual. In *Fl. Middlesex* 296, "*P. compressus* L. (*P. mucronatus* Schrad. Syme, E. B.)" is localized "about Staines, abundantly," on the authority of Hudson (Fl. Angl. ed. 2, 76). Hudson knew nothing of *acutifolius* or *zosterifolius*, but from his reference to R. Syn. (ed. 3), 149, I have little doubt that the former was the plant intended. The Isle of Dogs locality in Fl. Midd. does, however, refer to *P. Friesii* Rupr. (*P. mucronatus* auct.), as is shown by the specimen from Goodyer and Rozea (now in Herb. Mus. Brit.) on which the record is based.

P. alpinus Balb. (*P. rufescens* Schrad.). The authors of the *Flora of Middlesex* say this "occurs in ditches by the Colne between Rickmansworth and Henefield Mill; a station which if not

within must be very slightly beyond our limits." There is a specimen from this locality in Herb. Brit. Mus., collected by Dr. De Crespigny (not dated), on the label of which he notes: "in both counties!"

ARTHUR BENNETT.

[It may be worth while to add to the above the following records from Trimen's interleaved copy of the *Flora of Middlesex*, now in Herb. Mus. Brit., and to note for the benefit of future workers that this contains numerous additions both to localities and to the biographical matter which was so interesting a feature of the work. The order and nomenclature of the Flora is followed:—

P. lucens L. I. Colne, Uxbridge. VII. Duckett's Canal, *Warren.*

P. perfoliatus L. V. Thames at Kew, *J. Smith in Herb. Mus. Brit.*

P. crispus L. V. "Plentifully in ponds near Wellings Farm, Marylebourne," *Herb. Banks.* Pond by the fieldpath between 'the Plough' and Ealing Church, June, 1876, *Britten*; small pond by the creek near Brompton Cemetery, about 1860, *Britten.*

P. pusillus L. V. Opposite Isleworth Church, 1824: J. Smith in Herb. Mus. Brit. ("= broad-leaved *pusillus*, often called *compressus*"). VII. Bromley Marshes, 1844, *E. Palmer, Herb. S. P. Woodward.*

P. pectinatus L. VII. Duckett's Canal, 1872, *Warren.*

P. densus L. I. Uxbridge, abundant.

JAMES BRITTEN.]

THE SCAPE OF *TARAXACUM.*

BY WILLIAM H. BEEBY, F.L.S.

THE curiously indiarubber-like texture of the scape in the genus *Taraxacum* distinguishes it from all other British land plants, and it is not surprising to find that the peculiarity exhibited by that organ should be connected with the performance of some special office. I have not, however, met with any description of those movements which occur between the flowering and fruiting periods; no mention is made of *Taraxacum* in Darwin's *Power of Movement in Plants*, while no account is taken of the movements, so far as I have read, in recent descriptions of new species and subspecies, although they cannot be ignored if either the direction or relative length of the scape be made use of at all as a diagnostic character. I must admit, for my own part, that although I have cultivated one of the forms for a number of years, it was not until last summer that I noticed the fact that, while the scape of this form is quite prostrate in flower, it is quite erect in fruit. This circumstance led to the observations recorded below.

In 1901 I brought home from Shetland roots of a *Taraxacum*, which, although not in flower, appeared to differ from all of our recognized forms; the plant grew in some plenty among large stones by the South Loch of Hostigates, near Clousta, and has since been found in many other places in the islands. It is the *T. spectabile* var. *maculiferum* Dahlst. The type is described in the *Botaniska Notiser*, 1905, p. 159, and the variety in Ostenfeld's "Additions, &c." (*Botany of the Faeroes*, vol. iii.). *T. spectabile* Dahlst. is allied to *T. palustre*, but differs from it in many ways. The leaves are cut with rather large, more or less triangular lobes, and their upper surface is covered with more or less abundant, coarse, scattered, jointed, hyaline hairs, while there are usually a few hairs on the under side. The ligules are striped with reddish-violet on their under side, while their teeth are bright red, and this colour sometimes extends a little way down the inner face of the ligules. The stigmas are greenish. According to Mr. Dahlstedt, the fruit is larger, but the beak is only about one-fifth to one-fourth the length of the fruit, instead of nearly half as long. The outer phyllaries are less tightly adpressed in flower than in *T. palustre*. The var. *maculiferum* Dahlst. differs in its still more laxly adpressed phyllaries in flower, in its quite prostrate flower-scape, and in its leaves being marbled with purplish-chocolate; I think also that the outer phyllaries are rather narrower than in the type.

As *T. spectabile* has not been described in any of our books, I have indicated some of its characters above. The "*T. palustre*" referred to is the *T. palustre* (Ehrh.) Dahlst., and Mr. Dahlstedt considers that it is probably the same form as Smith's plant, but that *T. palustre* DC. is a different form, doubtless allied to *T. balticum* Dahlst.

The observations previously referred to are as follows, and it should be borne in mind that the scape of the var. *maculiferum* is completely prostrate in flower; in fact, when the plant is grown in a pot, the scape hangs over the edge, only turning up at the tip.

1. The day before the fruit is fully ripe and ready for dispersal the scape moves through an angle of 90°, becoming quite erect and nearly straight. For the most part during this movement, but to some extent previously, a considerable elongation takes place, the fruiting-scape becoming from one and a half to two and a quarter times the length of the flowering-scape, but usually about twice the length. The outer phyllaries are now quite tightly adpressed.

2. The day following the erection of the scape, if the weather be fairly bright, all the phyllaries are completely reflexed, the head expands, and the fruits are dispersed—all or some, according to the strength of the wind.

3. If the day following the erection of the scape be very dull and gloomy, the phyllaries remain tightly closed and no developments occur.

I am not able to give exact details concerning the times at

which the elongation takes place; it certainly occurs to some extent after flowering and before the erection; but chiefly, I think, during the erecting movement. Nor can I say how long the pericline would remain closed if the weather continued bad.

Particulars of four observations made last summer follow:—

Obs.	First Day.	Second Day.
1.	Two scapes rose and elongated about × 2.	All fruits on one head dispersed; all but three on the other. Very windy.
2.	One scape rose and elongated about × 2.	About half the fruits dispersed. A still day.
3.	One scape rose and elongated about × $2\frac{1}{4}$.	About one-fourth the fruits dispersed. A still day.
4.	Two scapes rose somewhat irregularly. Elongated about × $1\frac{1}{2}$.	Both periclines remained closed. Gloomy and wet. *Note.*—The third day being fine, both periclines expanded and the fruits were dispersed.

The end attained by these movements is clear, for did the fruiting-scape remain prostrate among stones or herbage there would be but little exposure to the wind, and the fruits would often fall all in a heap, which would not be advantageous to the species; but the erection of the scape, coupled with its considerable lengthening, exposes the heads to the full action of the wind, and enables the fruits to be much more widely dispersed. It did not occur to me, until too late in the season, to compare the cell-structure of the flowering- and fruiting-scape, but since during the lengthening of the scape it becomes considerably more slender, and its purplish-red tint evidently paler, I infer that the lengthening is achieved by means of the elongation of the existing cells rather than by any fresh growth from below; thus explaining the use of the indiarubber-like texture of the scape.

Movements more or less similar no doubt occur in all the forms; they certainly do in *T. officinale* (type) and in *T. lævigatum* DC., but I have not made any special observations on these.

It is well to bear in mind that forms which are described as having a prostrate scape may have that organ quite erect when in ripe fruit; also, that heads which are approaching ripeness often partially open under pressure. The phyllaries spread laterally, showing the fruits between, and the pappus expands. This might give the impression that the plant ripens its fruit with the scape still in the horizontal position; but such false-ripe heads may always be detected by the fact that the phyllaries do not, as indeed they cannot, become reflexed under pressure.

Mr. Dahlstedt records *T. spectabile* from Norway, Sweden, Faeroes, Iceland, Greenland, and Scotland. Besides in Shetland, it has been found on St. Kilda (O. Paulsen); and as both of these records are subsequent to 1905, it evidently occurs in other Scottish counties. The var. *maculiferum* is the much more common form in Shetland, and is also the St. Kilda form. Elsewhere this variety is only recorded from the Faeroes.

SHORT NOTES.

Ascochyta Quercus-Ilicis, sp. n.—This fungus causes irregular-shaped brownish spots on the upper surface of the leaves of *Quercus Ilex* L. The perithecia appear on the lower surface of the leaves in small scattered groups, corresponding to the spots on the upper epidermis. They cannot be discovered unless the leaves have been damped and the small stellate hairs removed with a fine soft brush, when they will appear like minute black spots. No species of *Ascochyta* is known to occur on *Quercus Ilex*, but two species have been described on oak-leaves, from which the new species differs in many respects. The following is a description :—

Ascochyta Quercus-Ilicis, sp. n. — Perithecia scattered, somewhat conical, punctiform, blackish olive-green, growing on the lower surface of the leaves, covered by stellate hairs. 110–130 μ diam. Sporules lanceolate, 1-septate, somewhat constricted at septum, hyaline to light green. 12–14 μ by 3–4 μ.

H. T. Güssow.

Plate 489 e.—1. Spots on upper epidermis caused by *Ascochyta Quercus-Ilicis*. 2. Lower surface of same leaf, upper half of which shows perithecia after removing hairs. 3. Two perithecia, one showing rather elongated neck. 4. Spores of the fungus.

Lathræa clandestina L. near Cambridge. — Mr. Bernard Reynolds sends us a living specimen of the above-named plant in flower, which he found last month near Cambridge. For obvious reasons we withhold further description of the locality. The plant covers a space of about 2 ft. by 3 and seems to be thriving; it does not appear to have been observed until this year.

Swartzia inclinata in Lancashire.—On February 15th, while botanizing on a piece of boggy ground at Rainford Junction (v.-c. 59), alt. about 200 ft., Mr. J. A. Wheldon and I found this rare moss. It was in fine fruit and associated with the hepatic *Lophozia badensis* Schiffn., which occurs abundantly. At first the moss was taken to be *Swartzia montana*—although it seemed to have an unfamiliar and untypical appearance—as this latter species was recorded as far back as 1851, in Dickinson's *Flora of Liverpool*, as having been found by Wm. Skelhorne on Rainford Moss. It had, however, not been seen since, and in a list of the mosses of the neighbourhood, contributed by Mr. Wheldon to the *Handbook* for the British Association meeting at Southport in 1903, some doubt was thrown on the old record. On closer examination, how-

ever, our find turns out to be, not *S. montana* but the rarer species *S. inclinata*, which has not been previously recorded for Lancashire. This is no doubt the moss which Skelhorne found, but whether his station is the same as ours we do not know.—W. G. Travis.

Caermarthenshire Plants (pp. 83–90).—A few notes on the list are perhaps worth making:—*Sesleria cærulea* was found in Breconshire, not Glamorganshire. There seems good reason to suppose *Dianthus Armeria* a native of Glamorgan; it was found in two localities near Swansea Bay (I have seen specimens from Cwmafan), both of which are much built over now. The *Hieracium* list (I say it with apologies) bears, in view of Mr. W. R. Linton's handbook, an antiquated appearance, *e.g.*, in the association of *H. pulchrius* with *H. sciaphilum*, in the record of *H. dædalolepium*, &c. The form of *Liparis* from South Wales has received a distinct name as a variety: var. *ovata* Riddelsdell. *Polygonatum multiflorum* has been recently recorded as a native of Glamorganshire. The *Sparganium* from Craig-y-llyn, Glamorganshire, is certainly *S. affine*.—H. J. Riddelsdell.

Œcology of Montia fontana (p. 92).—Perhaps the "cryptic or obscure meaning" of the word "bog," which Mr. L. H. Riley is in search of may be found in the following quotation from Webb & Coleman's *Flora Hertfordiensis*, 1849 (Introduction), p. xliv, repeated by Pryor in Fl. Herts, 1887:—"We are very deficient in that kind of sandy soil impregnated with iron which affords pabulum for the heath tribe, and whose springs give origin to bogs, properly so called; for a bog, in our view, is a chalybeate spring, producing the moss *Sphagnum*, with the other attendant plants,—other wet places are marshes, not bogs, in the following pages." Whether Coleman, who wrote the Introduction, was personally responsible for this definition, or whether he obtained it from some higher authority I cannot say; but some such definition is doubtless in the minds of those botanists who disclaim the word for the habitats of *Montia fontana*.—H. Peirson.

[This subject has now been sufficiently discussed.—Ed. Journ. Bot.]

NOTICES OF BOOKS.

British Plant Lists.

The London Catalogue of British Plants. Tenth Edition. 8vo, pp. 52. Price 9d; limp cloth interleaved, 1s. 3d. net. February 1908.

List of British Plants containing the Spermophytes, Pteridophytes and Charads found either as natives or growing in a wild state in Britain, Ireland, and the Channel Islands. By George Claridge Druce, M.A., F.L.S. Cr. 8vo, pp. xvi. 104, wrapper, 2s. 6d. net; cloth interleaved, 3s. 6d. net. Oxford: Clarendon Press. January 1908.

The issue of a tenth edition of the familiar *London Catalogue* follows close on the new *List of British Plants*, and the two may

fitly be noticed together. The former retains the features which have made it practically indispensable to British botanists, especially for those who make exchanges. It occupies a midway position between the *List of British Seed-Plants*—which excludes all varieties and most casuals—and Mr. Druce's new *List*—which includes both varieties and introductions on the most lavish scale —and thus achieves a happy and reasonable middle course. The work, however, has been thoroughly revised, chiefly by Messrs. W. A. Clarke and E. S. Marshall, who have in the main followed the Vienna Rules, although "against their own personal preference." For particular genera, experts have been called in—the late Rev. W. R. Linton for *Hieracia*, the Rev. W. M. Rogers for *Rubus*, Mr. Arthur Bennett for *Potamogeton*, Major Wolley-Dod and the Rev. E. F. Linton for *Rosa*, Mr. Marshall for *Betula*, *Carex*, and other genera, the Messrs. Groves for *Batrachium* and *Characeæ*. Mr. Hanbury's share in the work for which he stands as sponsor is, apart from the preface, confined to the important function of taking the financial risk of the Catalogue, which however we are glad to know pays its way.

The nomenclature of the *Catalogue* has been thoroughly revised, and, allowing for the different limitation of genera in certain cases, is in the main in accord with the British Museum list. While on the whole it presents few points for criticism, there are certain entries which recall the Petrine comment on the Pauline Epistles—*e. g.* it is startling to see two varieties of *Radicula Nasturtium-aquaticum* credited to "Rendle & Britten," seeing that the List compiled by these authors contains no varieties. The status of certain plants is also puzzling. We read:—"*Italics* denote a *casual* or only *planted* alien, apparently not yet naturalized. Obviously, the line between such and those marked with a * [which "implies that a plant is either most probably or certainly not aboriginal (native), but more or less well-established"] cannot be drawn quite accurately, but each case has been carefully considered." We should remove several from the former to the latter category—e. g. *Oxalis stricta* (*corniculata* auct. pl.), which is certainly firmly established in Devon and Cornwall; *Hypericum calycinum*, which covers the railway banks about Box Hill Station for a considerable distance, and for fifty years has been "thoroughly naturalized in the woods on Box Hill" (*Fl. Surrey* 48, 1863); *Spiræa salicifolia*, which seems wild near some of the Welsh lakes; *Galinsoga parviflora*, which (unless it has disappeared lately) has been for many years as abundant as Groundsel about Kew; *Claytonia sibirica*, which as long ago as 1837 had the appearance of a native in a wood near Chatsworth (see Baxter's *Brit. Fl. Plants* iv. 253) and was in 1875 (and probably is still) in great abundance in a wood at the summit of Calton Hill near Bakewell, in the same neighbourhood, at which date it practically filled a little copse near Bury, Lancashire. On the other hand, we should not have thought *Medicago sativa* or *Stachys annua* "well established"; and we cannot think that *Campanula persicifolia* and *Sisyrinchium californicum* can

stand as genuine natives. The account of the Gloucestershire locality for the former (Journ. Bot. 1903, 290) is (of course unintentionally) misleading; the plant occurs in very small quantity, and there are houses nearer than is there stated: while the introduction of the *Sisyrinchium* may reasonably be accounted for by Mr. Druce's suggestion (see Journ. Bot. 1907, 248) as to the wrecking of a vessel laden with American grain; by the way, should not *Polygonum sagittatum*, which according to Mr. Druce's note (*l. c.*) "now looks absolutely native," appear in the *Catalogue*? *Salvia verticillata* is perhaps as yet insufficiently established, but it might claim italicized admission.

The prefix of the asterisk to such plants as the Poppies is a new feature in this edition. There is much to be said for considering the Poppies as weeds of cultivation, but it seems strange to place *P. somniferum* on the same footing as the other species. Is this anywhere "more or less well-established"? Any way its status is very different from that of the other species, and this should be indicated—our own inclination would be to italicize it. Moreover it seems odd to brand all the Poppies as introductions and to pass all the Fumitories as natives.

It will we think be somewhat difficult to assign the proper authority to some of the new combinations. When it is definitely stated that a genus has been undertaken by some one author, the matter is simple; but in other cases it is not so. For example, "*Glyceria Foucaudii* Hackel in litt." presents more than one difficulty. In the first place it is a *nomen nudum*, for although undoubtedly synonymous with *Atropis Foucaudii* Hack., that name is not cited, nor is any synonym given; similarly the two varieties of *Betula tomentosa*—"b. *denudata* E. S. Marshall" and "c. *parvifolia* E. S. Marshall"—have not we believe been previously published. In the latter case although the names are *nomina nuda* there is no difficulty as to their author, for it is stated in the introduction that Mr. Marshall revised the genus *Betula*; but in the former we presume Mr. Hanbury must stand sponsor, and that the name would have to be quoted as "*G. Foucaudii* Hackel ex F. J. Hanbury" if it were regarded as validly published, which we do not think is the case.

We are aware, of course, that Mr. Hanbury does not and indeed cannot claim any responsibility for the botanical portion of the *Catalogue* of which he is editor. The case, although not absolutely analogous, has much in common with that of the *Hortus Kewensis*, the names in which are by common consent cited as of Aiton, although it is known that he was not personally responsible for them. The cases in which the question would arise are mainly those of varieties, and these for the most part are disposed of by the fact that Mr. Druce's *List*, in which they also occur, antedates the *Catalogue* by about a month: thus the varieties of *Radicula Nasturtium-aquaticum*, referred to above, will stand as of Druce. A correlation of the two publications will thus be necessary; but it will, we fear, present many difficulties—e.g. *Betula tomentosa* stands in them thus:—

Lond. Cat. ed. x.	Druce List.
tomentosa Reith.* & Abel (pubescens Ehrh.)	tomentosa Reith. (B. pubescens Ehrh., B. glutinosa Wallr.).
b. denudata E. S. Marshall.	b. carpatica (Waldst. & Kit.).
c. parvifolia E. S. Marshall.	× nana = intermedia Thom.
	× alba = ? odorata Bechst.

Nor do we envy those who have to reconcile the present treatment of such critical genera as *Hieracium* with that of the last edition. By the way, we are asked to point out that by an oversight *H. cambricum* F. J. Hanb. has been omitted—it should come in Group iv. after *H. vagense*.

Mr. Druce has bestowed on his new *List of British Plants* much time and care which it seems ungracious to say might have been better bestowed; yet we think that such will be the conviction of those who remember that the author has practically finished his Flora of Buckinghamshire, thus completing the botanical trilogy of the West Thames subprovince, and there can be no doubt that the publication of this would be of far more value than this new arrival on a ground already sufficiently occupied. He tells us that the *List* was "attempted with no light heart, but is the outcome of over thirty years' field-work in every British county." We confess we do not see the connection of the two statements. With regard to the former, it can scarcely be contended that the *List* was necessary: all that British botanists require in this direction is supplied by the *London Catalogue*, which has sufficed for some generations and will certainly be in no way superseded by Mr. Druce's *List*. Nor do we see how such a list can be "the outcome of field-work." or how it in any way embodies the result of such investigation. It is largely concerned with nomenclature—which has so little connection with "field-work" of any kind that some even decline to regard it as a part of botany—and is thus a book for the study, not for the field.

The *List* is swollen to an abnormal extent by the inclusion of "plants ranging from the most absolute native to the mere ballast waif." We are certainly among those who "take objection to their inclusion," nor are we convinced by the argument that "the waif of to-day may be the pest of the next decade," although we think it may claim to be the pest of this *List*. We have no guarantee that the determinations are accurate—*e. g.* eight Asters are enumerated, but several of these names have been applied at different times to the same introduced plant, and we have no evidence that they represent as many species. Two adjoining columns on pp. 36, 37 contain respectively 21 and 20 introductions against 2 and 3 natives; and the *reductio ad absurdum* is surely reached by the inclusion of the Vine, Fig, Date-palm and Orange (!) in the *List*.

* This name, in each case printed as if an abbreviation, occurs in both lists; in the *Index Kewensis*, following Regel in DC. Prodr. xvi. 2, 167, it appears as "Retz." The author's name as it appears on the titlepage of the part of the work from which *B. tomentosa* is cited is Reiter, but this again is hardly accurate, as it appears in the preface and title of the first part as Reitter.

We observe with regret that Mr. Druce has thrown in his lot with the section of transatlantic botanists who have decided to ignore the list of "nomina conservanda" appended to and indeed forming part of the Vienna Rules. As we have said more than once, we think that the adoption by the Congress of this arbitrary and incomplete list, practically without discussion, was a great misfortune and a blot upon its proceedings; but we cannot approve the action of those who, taking part in such a Congress, decline to be bound by its decisions. There was and is absolutely no justification for ignoring the genera of so shrewd and competent a botanist as Hill, except such as may be based on the ignorance of the Germans, who bulked so largely in the Congress, as to the work of the earlier English botanists—notably Hill and Philip Miller. So far as we know, Mr. Druce stands alone among British botanists in ignoring this list, although many dislike it as much as we do; but the mischief has been done, the rule has been made, and to refuse to abide by it is to carry on the anarchy which the Rules were intended to reduce to order. It is, however, curious to find such a stickler for priority as Mr. Druce is, refusing—apparently on grounds of mere convenience or personal predilection—to adopt either *Alsine* or *Tissa* and following the Rules in the use of *Spergularia*.

Those who have noticed the readiness with which Mr. Druce raises to the dignity of named varieties forms which few would regard as other than states unworthy of a name—e. g. "*Scilla non-scripta* (L.) Link & Hoffmg. b. *bracteata* (Druce)" and "*Pulicaria dysenterica* b. *longiradiata* Druce"—will not be surprised to find that the list of these "is made as catholic as possible." "Some botanists," says Mr. Druce, "may be shocked at the number, but there are advantages in including them"; what these "advantages" may be we have no notion, seeing that we have no indication of the authority on which they are included, and no indication that they have been correctly identified. A number of them have been shown by competent observers in this Journal and elsewhere to be unworthy of the status—e. g. *Spiræa Ulmaria* var. *denudata*, *Sherardia arvensis* var. *Walraveni*, *Gnaphalium uliginosum* var. *pilulare*. We are glad to note that in many cases the criticism of this Journal has been accepted, and that in other instances Mr. Druce has modified his original conclusions—e. g. *Fragaria bercheriensis* is now reduced to a variety of *F. vesca*.

We note that under *Viola tricolor* Mr. Druce places as varieties nine plants originally described as species, mostly by Jordan, and under *V. arvensis* twelve. We are not aware how far his investigations support these conclusions, but unless such investigations have been made, the process seems somewhat sweeping. As a result, twenty-one new combinations are indicated under these two species alone; the actual number is perhaps somewhat less, as *V. mentita* Jord. has been already published by Mr. Druce (Fl. Berks, 79) as a variety, and there may be others. His unfortunate passion for new names finds an outlet through the restoration or retention of genera usually abandoned, and another, even less justifiable, in

the creation of names for hybrids—such are "Ranunculus Baudotii c. marinus × Drouetii Groves = *R. Grovesii"; "Fumaria officinalis L. × densiflora = F. Salmoni"; "Potamogeton alpinus Balbis × ? prælongus = Palmeri."† The second is apparently based on a plant referred to by Mr. C. E. Salmon in this Journal for 1907, p. 120, which that writer thought "might well be of hybrid origin"; as to the third, Mr. Druce rushes in where Mr. Arthur Bennett fears to tread; the latter (*op. cit.* 175), while suggesting the hybrid origin, points out that *P. prælongus* is not recorded for Hampshire where the plant occurred, nor indeed for the southern counties. The names, however, may be altogether ignored, as they do not comply with the Rule which governs publication.

One of the worst of Mr. Druce's creations is "*Polygonatum Sigillum* (Lepech.)." The plant which we have hitherto been and may still be content to call *P. officinale* All. had already been endowed by Mr. Druce with a name—*P. odoratum*—which he now allows is untenable. His second attempt is even more unfortunate. We were unable to learn from him on what this new combination was based, but subsequently traced it to Ledebour's *Flora Rossica*, iv. 124, where it stands "*Convallaria Sigillum* Lepech. It. i. 47, iii. 40" and is given as a synonym of *P. officinale*. Names quoted in synonymy are invalid by the Vienna Rules, and we do not think Mr. Druce can have looked up the reference to Lepechin: had he done so he would have seen that in each place *Convallaria Sigillum* appears only in a footnote as an equivalent of "*Weiswurz*." Ledebour's identification of this with *P. officinale* seems on the face of it extremely doubtful. Both "Weiswurz" and the Latin *Sigillum Salomonis* were originally applied, as "Solomon's Seal" is still, to *P. multiflorum*; see Bauhin, *Pinax*, 303, who refers to Brunfels, whose chapter "De Sigillo Salomonis, Teut. Weysswurz" (Herb. iii. 93, 1540) is accompanied by an excellent figure of *P. multiflorum*; both this and *P. officinale* are widely distributed in Russia. But even if the plants were rightly identified, it is difficult to believe that Mr. Druce can think this sufficient ground for creating a new name, were it not that such creation seems to have become with him an obsession. Common sense will surely endorse the Vienna Rule (Art. 37) which says that "a species or a subdivision of a species, announced in a work, with a complete specific or varietal name, but without diagnosis or reference to a former description under another name, is not valid; citation in synonymy or incidental mention of a name is not effective publication." A. De Candolle's Art. 46 was equally explicit:—"A species announced in a work under generic or specific names, but without any information as to its characters, cannot be considered as being published."

Another point in which we fear Mr. Druce's List is open to adverse criticism is that of distribution. A comparison with the

† We note incidentally that each of these three commemorative names is printed differently: the first and second are in small type, but the former has a prefixed asterisk which we are told (p. iv) indicates doubtful nativity; the third (Palmeri) appears in thick black type.

new edition of the *London Catalogue* shows serious divergences throughout; in *Fumaria* no two figures correspond, and as Mr. Pugsley revised the species for the *Catalogue*, it may be supposed that this is the more accurate. The vice-comital numbers stand thus:—

	L. Cat.	Druce List.
pallidiflora Jord.	40	46
purpurea Pugsley	24	15
Boræi Jord.	61	53
muralis Sonder.	5	? 20
occidentalis Pugsley	2	Cornwall
Bastardi Bor.	31	48
officinalis L.	106	109
densiflora DC.	43	44
Vaillantii Lois.	15	16
parviflora Lam.	22	23

Ireland is excluded from the *London Catalogue* estimate, but Mr. Druce's census for that country is hardly more satisfactory. He has apparently overlooked Mr. Praeger's careful revision of the distribution (*Irish Naturalist*, 1905, 156–163), and a comparison of this with his *List* shows the following discrepancies:—

	Praeger.	Druce.	
capreolata L.	12	24	
purpurea Pugsley	9	0	
Boræi Jord.	16	14	
muralis Sonder.	0	14	
confusa Jord.	27	29	(Bastardi)
,, var. hibernica Pugsley	18		
densiflora DC.	5	? 4	
officinalis L.	21	28	

Mr. Druce follows the precedent of most other lists and British floras in giving no reference to the place of publication of each species; his reason for the omission, however—that this "can be obtained in almost all cases from the *Index Kewensis* or its *Supplements*" is hardly convincing, as that costly work is not often to be met with in the libraries of amateur botanists. It would have been to the advantage of the *List* if he had at any rate himself looked up these references—we should then have been spared the supersession of *Ranunculus sardous* Crantz (Stirp. Austr. fasc. ii. 84, 1763) by *R. parvulus* L. (Mant. 79, 1767). On the other hand, even in the case of introductions, he supplies this information for genera and even for orders, which can be of little service to workers at British plants. The explanations of abbreviations would have been more conveniently given in tabular form; they are incomplete—*e. g.* we find no explanation of "Amph." applied to *Oxalis corniculata* and *O. stricta* (names Mr. Druce employs in the general rather than in the accurate sense), nor can we supply it—the names stand as "*O. corniculata* L. Amph." and *O. stricta* L. Amph."

Among the smaller points which suggest criticism is the statement that it was "evidently the intention of Linnæus" to employ

a capital initial for trivial names ending in *oides*. We do not know how Mr. Druce ascertained this intention, but it certainly was not Linnæus's practice; he seems to have used either large or small letters indifferently—thus in *Sp. Pl.* 792 we have *Picroides*, and on p. 790 *picroides*; *Echioides* and *Hieracioides* are on p. 792, while on p. 793 is *asplenioides*. "Spermophyte" seems to us an objectionable abbreviation, but if it is adopted why not "Pterophyte," which Mr. Druce correctly writes Pteridophyte?

We are a little surprised that Mr. Druce makes no mention of the British Museum *List of Seed-plants*, more especially as certain of the names he employs were first restored therein—some of them incorrectly, as was shown in this Journal for 1907 (pp. 435–445). Mr. Hanbury in his preface makes full acknowledgement of the Museum *List*, and we should have expected some reference to it in Mr. Druce's publication.

We regret that we cannot speak more favourably of an undertaking on which, as we said at the outset, much time and care have been expended; but we cannot feel that the result is in any way adequate to the outlay. Nor can we compliment the Clarendon Press on the get-up of the book; the pages are so cropped that it would be impossible to annotate them, and the work has thus a mean appearance; moreover it is very dear—half-a-crown for 119 pages! This absence of margin is the more remarkable in that the *List* is "compiled especially for working botanists and members of the Exchange Clubs," who will, we think, prefer to continue their long-established use of the cheaper and in every way more convenient *London Catalogue*.

The Land-Vegetation of the Faroes. By C. H. Ostenfeld. 8vo, 33 illustrations. Copenhagen: H. H. Thiele. 1908.

This interesting group consists of islands some twenty-five in number, of which seventeen are inhabited, and occupies nearly five hundred square miles, with little cultivation; they are very hilly, attaining in Osterö the altitude of 2792 feet. The group has been systematically investigated since 1896, when the work was inaugurated by Dr. Warming; this result formed a portion of the third part of *The Botany of the Faeröes*.

Dr. Ostenfeld's work, which relates principally to the phanerogamic flora, touching here and there on the mosses and lichens, suggests so many problems in botany, especially from its ecological side, that it is impossible to deal with its many-sided aspects in a short notice. Perhaps the best way to treat it is to note on turning over its pages some of the subjects discussed by the author.

He begins with an historical review of the literature relating to the vegetation of the Faroes. Prior to Dr. Warming's work, the principal source of information was Rostrup's Flora, published in 1870. Then follows a chapter on the influence of external factors on the vegetation, including climatal factors (temperature, rainfall, wind, humidity, &c.) and edaptive factors (the nature

and moisture of the soil). In discussing the influence of man and animals on the vegetation, the principal factor is shown to be sheep, of which there are about one hundred thousand on the islands. They are allowed to roam at large all the year round, and are very close feeders; so much so that it is only on the small islands (Holms) in the lakes that one can see the real vegetation. The same fact is noted by Mr. Beeby in the Shetlands.

Before entering on the biological features (duration, types, vegetation, flowering, fruiting, and altitude), the author gives a full list of the flowering plants and vascular cryptogams; these number two hundred and ninety-eight, of which thirty are not British, but these include twenty-one *Hieracia* which are said to be endemic, and one introduction. One can but think that when Shetland and Icelandic forms are more studied this number will be found to be overstated.

Of the vascular plants about ninety per cent. are perennial, the remainder hapaxanthic: twenty-one are "summer-annuals," and only one native (*Kœnigia islandica*) is annual on the mountains. *Cochlearia officinalis* is noted as both perennial and annual—in England it is often the former. The author speaks with approval of the work of British botanists with regard to *C. alpina* Watson and *C. micacea* E. S. Marshall: I have specimens of the former gathered in Leinum-field, Stromo, by Col. H. W. Fielden.

It is impossible to enter into the wide deductions suggested here under the head of biological types: if every country is to have its own types, the study will be practically impossible.

Under vegetative adaptation the author classes two hundred and sixty-nine species, forty-two as spot-bound (sedentary), and one hundred and eighteen as wandering "with above ground runners" or with subterranean shoots.

Under time of flowering (1902–1906) a list of sixty-four species is given of which the first flowering has been observed. Judging from the interesting remarks, the period of flowering is short. *Saxifraga oppositifolia*, first in flower on May 7 at 200 metres, was nearly over on May 20; in Arctic Norway (Tromso) it began to flower on April 14 and lasted till August 19 at 659 metres. The earliest date for *Silene acaulis* is May 7, while even in Greenland, at Upernivak, it was in flower on May 10, 1887*; in Arctic Norway from June 8 till August, and even at times to September 12. The dates of *Scilla verna* are, in the Faroes, June 14; Caithness, June 2; Cornwall, April 17; Carnarvon, May 14.

Want of sunlight seems to be the main reason that some thirty-six species do not ripen their fruits, "or cannot do so with certainty year after year." Aquatic plants (*Potamogeton*, &c.) rarely even set their fruits; *P. alpinus* has no fruits developed, though in specimens from Greenland (Baals River, 64° N. lat.)

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* Warming in *Festskrift* (1900), 261.

there are well-formed fruits. This reason does not however apply to the genus *Vaccinium*, of which vast tracts are often found without even a flower; Gardiner, in his *Flora of Forfarshire*, says that neither he nor the shepherds have seen a Forfar specimen of *V. uliginosum* in fruit.

Few of the species seem absolutely restricted to the mountains. Twenty-two are given as only found on the mountain plateaux (300 to 800 metres), while another twelve so found exceptionally descend to the lower regions. Of the eight contrasting lists given at various altitudes, 265 m. to **750 m., that of No. 4, "Rocky flat** on the southern slope of the mountain Fuglö," altitude about 510 m., may be compared with the Ward Hill of Hoy in the Orkneys, alt. 1564 feet. On Fuglö there is no *Arctostaphylos Uva-ursi*, *A. alpina*, *Vaccinium uliginosum*, *Saxifraga aizoides*, *S. oppositifolia*, *Azalea procumbens*, *Saussurea alpina*, *Ajuga pyramidalis*, *Dryas*, *Oxyria*, or *Draba incana*; while on the Ward Hill there is no *Cerastium Edmonstonii* * (*C. arcticum* Lange), *Saxifraga cæspitosa*, *Arabis petræa*, *Luzula spicata*, *Salix herbacea* (?), *Kœnigia*, *Poa glauca*, *Polygonum viviparum*, *Carex rigida* (?), or *Alchemilla alpina*.

Under the heading "Plant Formations" the author quotes J. Bematsky,† who makes three divisions: 1. Natural; 2. Culture formation; 3. Derelict formations. Dr. Ostenfeld considers that two are sufficient, but with this I do not concur; the third in some parts of England gives some remarkable aspects. In Suffolk and Norfolk on the "Breck-lands," large fields, originally heath-warren, may be seen reverting to their original state, the first indication of which is *Senecio Jacobæa* in great quantity. The author goes on to describe the flora under many conditions and aspects:—

1. Halophile formations, with four subdivisions; 2. Subalpine formations, with four subdivisions, and six minor subdivisions; 3. Alpine formations, with three subdivisions; 4. The vegetation of the sea-fowl cliffs; 5. Formations in the cultivated area, with three subdivisions.

The author gives numerous lists after each subdivision of the dominant and subdominant species; but one doubts if these can be always maintained, as the "transition" examples are too numerous to be convincing.

The weeds of the barley, oat, and bere fields are *Galeopsis Tetrahit*, *Avena sativa*, *Montia lamprosperma* Cham., *Stellaria media*, *Poa trivialis*, *Ranunculus repens*, *Spergula arvensis* (*sativa*), *Cerastium vulgare*, *Anthoxanthum*, &c. Numerous lists are given of the "Bö formation" grass-meadows, garden weeds, &c.

Carex kattegatensis Fr. and *C. Lyngbei* Drej. are frequent and hybridise in places. Everywhere in Europe it seems that the first grows in close proximity to the sea; our Caithness examples, however, grow three miles away. One element of the Flora is the

---

* But "*C. latifolium*" was reported thence in Neill's *Tour*, 1806.

† Engler's Bot. Jahrb. Bd. xxxiv. pp. 1–8.

abundance of *Archanglica officinalis*, both on the cliffs and in the cultivated area.

The illustrations are excellent, especially when the overcast sky is considered; one of a "Flowering cushion of *Silene acaulis* on Stromö" shows hundreds of flowers expanded. Another, "Street in Thorshaven showing grass-vegetation on the roofs," is very clear and sharp.

A result of later investigations is that some species, reported by earlier observers and classed as errors, have been refound, such as *Ranunculus auricomus*, *Oxalis Acetosella*, and *Bartsia alpina*.

ARTHUR BENNETT.

BOOK-NOTES, NEWS, &c.

AT the meeting of the Linnean Society on February 20 a very interesting paper was read by Mr. Arthur W. Sutton, "On Wild Types and Species of the Tuber-bearing Solanums." He stated that his study dated from 1883, when the late Lord Cathcart suggested crossing the wild types with the cultivated potato to obtain a race of commercial potatoes which would resist the ravages of the potato disease, *Phytophthora infestans*. Upon this Mr. J. G. Baker made his inquiry into the various species and types of tuber-bearing Solanums laid before the Society on January 17th, 1884, and published in its *Journal*, xx. 498. Many hundreds of attempts were made to fertilize *Solanum Maglia* with the cultivated potato, but only one hybrid seedling resulted, from a cross made in July 1887, and though cultivated for twenty years it has shown no superiority over ordinary potatoes. The so-called *Solanum Commersonii* "Violet," was stated to be a mutation obtained through bud variation from the wild *Solanum Commersonii* Dunal. In opposition to this claim many growers assert that it is identical with a German potato, the "Blue Giant," raised by Herr Paulsen. Many wild types of tuber-bearing Solanums have been experimented with during the last few years, including *Solanum tuberosum*, two forms from Mexico, *S. polyadenium* Greenm., *S. verrucosum* Schlecht., *S. Maglia* Schlecht., *S. etuberosum* Lindl., *S. Commersonii* Dunal, received from Uruguay, *S. Ohrondii* Carr., *S. tuberosum* var. *boreale* (syn. *S. Fendleri*). All these wild types flower freely, but in every case where a wild type produces fruit it has, with the exception of *Solanum etuberosum*, reproduced itself absolutely pure from seed; whereas all varieties of the cultivated potato which produce seed give rise to the greatest possible variation in the seedlings, none corresponding exactly to the parent. There is also a striking difference in the form of the pollen-grains of the wild types of tuber-bearing Solanums compared with pollen-grains of cultivated potatoes, the former being elliptical, and the latter very irregular in form. *Solanum etuberosum* is the only wild type of which the seedlings have not reproduced the typical form, but have, on the other hand, given precisely the same variation in habit of foliage, form, size, and colour of tuber, &c., as is

found in the seedlings from the cultivated potato. Although cultivated continuously for twenty years, it has never been seen to produce a fruit until 1906, when one berry alone was found, and from seed thus obtained twenty plants were grown in 1907, differing from each other as just stated. The specific name "*etuberosum*" was given by Lindley, but small tubers are invariably found under cultivation, and their size has greatly increased during the past twenty years, until they resemble in size the cultivated potato. The pollen-grains of the seedlings from *Solanum etuberosum* retain the elliptical form of the type, although the pollen-grains of a hybrid obtained by crossing a cultivated potato with *S. Commersonii* type vary greatly in form. As *S. etuberosum* has given seedlings many of which more resemble the cultivated potato than the type, it is suggested that this may have been one of the parents of cultivated potatoes of to-day; and, conversely, that as no other wild type experimented with has given seedlings which vary in any degree from the type, it is unlikely that either of these wild types gave rise to our cultivated potatoes. A fact of special interest and importance is stated, that during the twenty years of cultivation no plant of *Solanum etuberosum* has ever been noticed as affected by the fungus *Phytophthora infestans*, although during the whole period it has been grown in close association with potatoes which have suffered more or less from it year after year. The potatoes originally introduced into England or into Europe were certainly introduced as cultivated potatoes, and not as wild types, and it is at least doubtful whether in Chili, Peru, or elsewhere, any specific type of tuber-bearing *Solanum* (apart from *Solanum etuberosum*) can be found which will, under cultivation, give plants at all like the potato of commerce. A brief summary of the history of the introduction of the potato into Europe was given, and a photographic copy shown of the earliest drawing of the potato, by Philippe de Sivry, sent by him to Clusius in 1589 and preserved in the Musée Plantin at Antwerp.

Prof. Sargent has issued the first part of the second volume of his important work on *Trees and Shrubs*, "illustrations of new or little-known ligneous plants prepared chiefly from material at the Arnold Arboretum of Harvard University," of which arboretum he is the Director. Prof. Sargent's reputation was established long since by his handsome and scholarly *Silva of North America*, to which *Trees and Shrubs* may be regarded as in some sense supplementary, and while the plates of the more recent work cannot be regarded as equal in beauty to those of its predecessor they attain a similar high level of accuracy and from a botanical standpoint are as useful. The present part is one of four, each containing 25 plates and costing 5 dollars, which will make up a volume. The contents are sufficiently varied; they include six new species of *Cratægus*—a genus of extraordinary variability in North America, concerning which reference may be made to Prof. Sargent's paper in this Journal for August last; eight Chinese and Japanese Viburnums, three of them new, and two Loniceras, described by Dr. Rehder, the most recent monographer

of the latter genus; *Ulmus japonica*, now specifically separated by Prof. Sargent from *U. campestris*, of which it had been considered a variety; two species (one new) of *Berberis*; two Pines, described by Mr. G. R. Shaw: *Rhododendron Kæmpferi* Planch.; *Acer sutchuense* Franch.; *Malus Dawsoniana* Rehder (a new hybrid between *M. fusca* and *M. communis*) and *Alvaradoa amorphoides*. The work, which is issued by Messrs. Houghton Mifflin & Co., of Boston, is admirably printed.

THE Canadian Department of Agriculture has issued a handsome quarto volume on the *Farm Weeds of Canada* which cannot fail to be of great service to the farmers of that region. There are 52 excellent plates by Mr. Norman Criddle, each representing some plant which it is highly desirable they should know how to deal with, while on four others, even more useful, the seeds of these species are very carefully portrayed, of the natural size and also enlarged. The letterpress, a page to each plate, by Dr. James Fletcher, F.L.S., has been prepared with equal care; a good description of the plant is followed by notes on its occurrence, on its mischievous effects and their remedy; there is also a useful introduction dealing with various practical points in connection with agriculture, and including a glossary. We have never seen a work more thoroughly adapted to its purpose, and we congratulate the Department on an excellent piece of work.

THE latest volume of the County Victoria History is the first of the County of Kent. The Rev. E. S. Marshall deals with the flowering plants and ferns and *Characeæ*, the remaining cryptogams being treated by Mr. E. M. Holmes. The eccentricity which has throughout characterized the editing of this important series finds illustration here; Mr. Marshall's name appears nowhere in the body of the book, and in the list of contents stands only as author of the "introduction" and *Characeæ*. Moreover, judging from this table of contents, it would appear that the flowering plants and ferns are entirely omitted, for they find no mention, being included under "introduction"! It need hardly be said that Mr. Marshall's account is an excellent summary of the phanerogamic botany of the county.

THE *Westminster Gazette* of March 17 supplies us with an excellent example of newspaper botany:—"Botanists seem now agreed that the original shamrock associated with St. Patrick was not the three-leaved clover generally worn to-day, but the wood-sorrel. This pretty little plant, now beginning to bloom in all the public woods around London, has always been surrounded with an atmosphere of religious mystery. It was held in mystic veneration by the Druids, and, as Ruskin points out, has always been a favourite emblem in Christian art, both for sculptors and painters." Mr. Colgan pointed out long ago that the generally accepted representative of the Shamrock is *Trifolium minus*. We have no knowledge of any "atmosphere of religious mystery surrounding" the Wood-sorrel, nor is there any evidence of its "mystic veneration by the Druids," and far from being "a favourite emblem in Christian art" it is but rarely employed therein.

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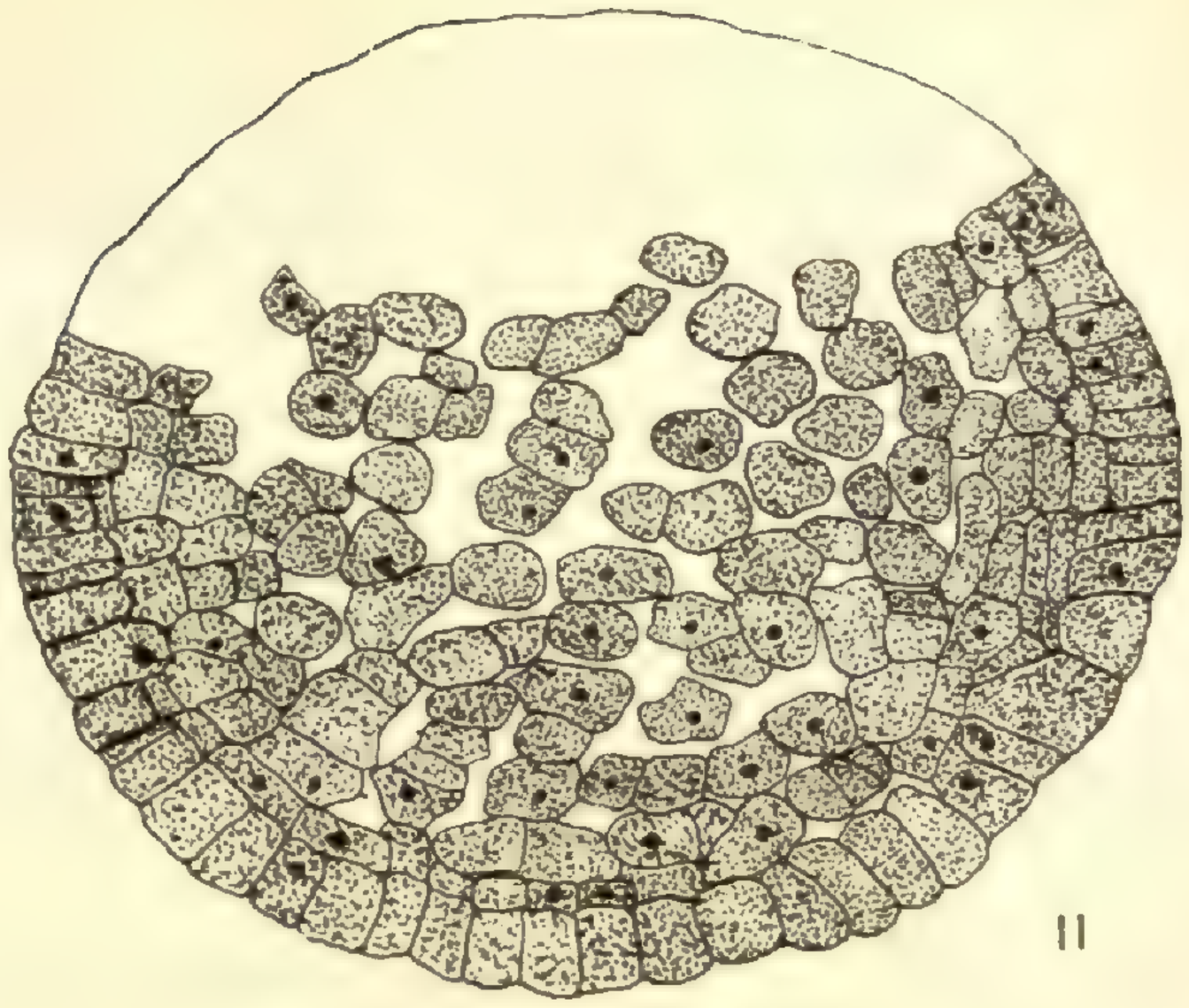

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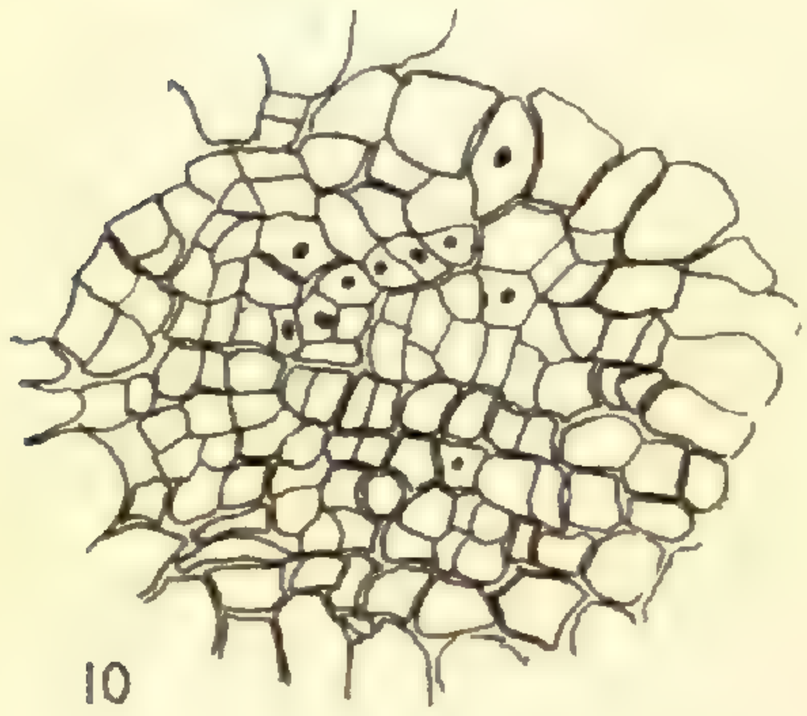

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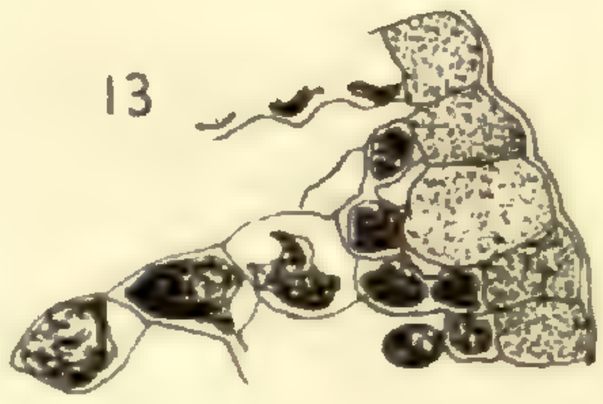

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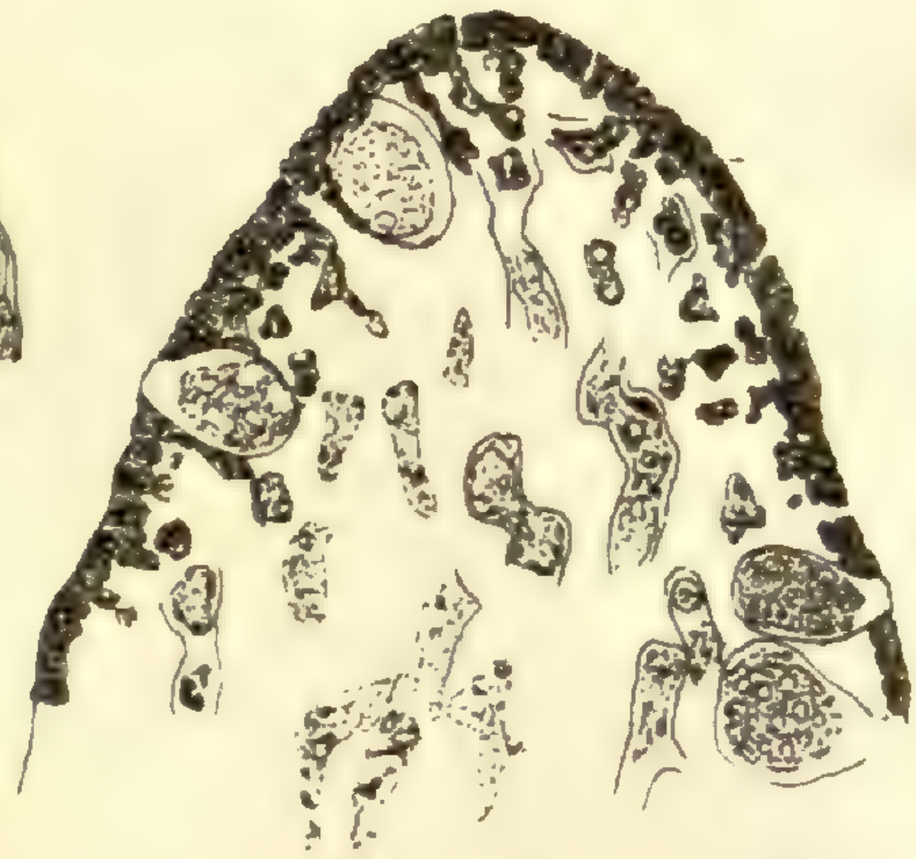

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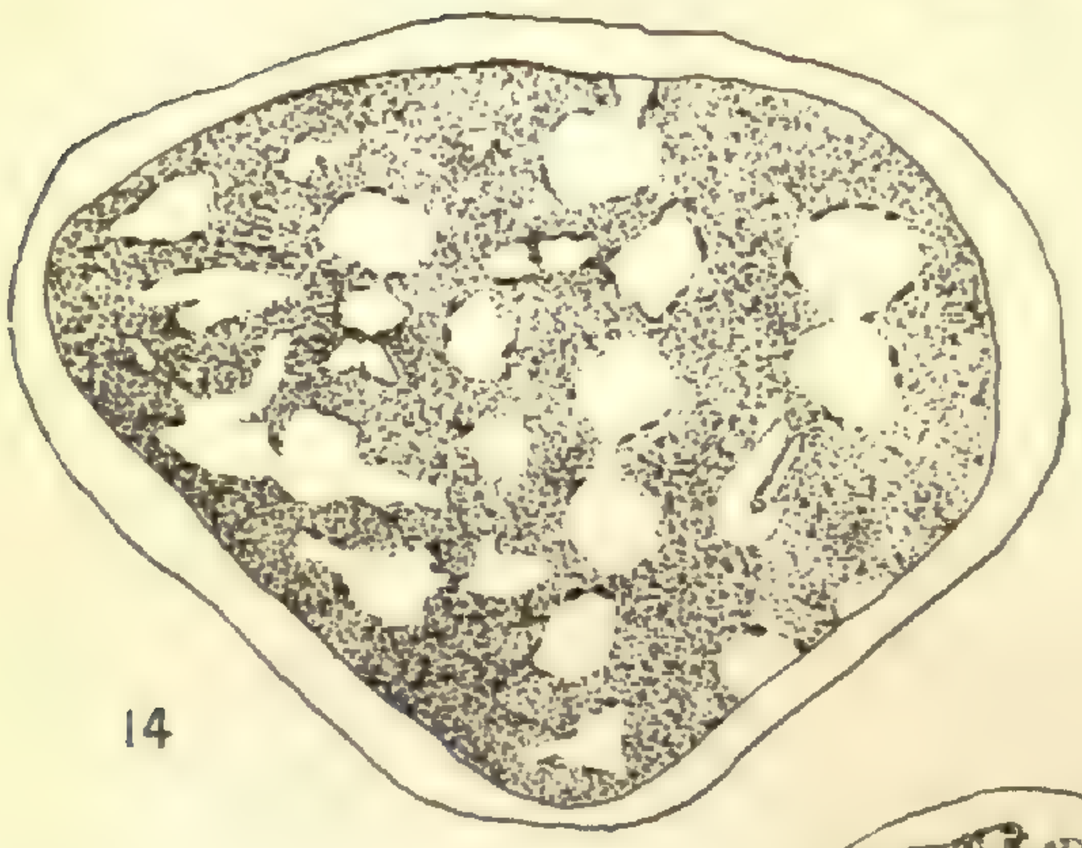

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SCYTOTHAMNUS AUSTRALIS Hook. f. & Harv.

THE MORPHOLOGY AND SYSTEMATIC POSITION OF *SCYTOTHAMNUS AUSTRALIS*.

By Charlotte M. Gibson, B.Sc.

(Plates 490, 491.)

This alga was first described as *Chordaria australis* by J. G. Agardh in *Linnæa*, xv. p. 47 (1841). It had been collected in New Zealand during the voyage of the 'Astrolabe' and given to Agardh by Achille Richard. It was sterile, and was considered by Agardh to resemble *Cystoseira* in habit but in structure to be scarcely distinct generically from *Chordaria*. Four years later it was made the type of a new genus, *Scytothamnus*, by Hooker and Harvey in Lond. Journ. Bot. iv. p. 531, and was furnished with a new description based upon better material collected by Sir Joseph Hooker in the Bay of Islands, New Zealand, where it is common on tidal rocks. These authors give an accurate description of the mature vegetative structure of the thallus, making the statement that it is solid or hollow according to age. They describe the reproductive organs as "utriculi oblongi, inter fila peripherica lia nidulantes, apicales," and they regard the genus as being related to *Chordaria* and *Mesogloia*. J. G. Agardh (Sp. Alg. i. 64, 1848), in redescribing the plant, expresses a similar opinion, based upon the structure of the thallus and the position and appearance of the sporangia. In describing it again, however, in 1881 (Till Algern. Syst. ii. 62), he points out that it differs from *Chordariaceæ* in that its peripheral filaments are not free but are cemented together into a firm tissue.

De Toni (Syll. Alg. iii. p. 455, 1895), and Kützing (Sp. Alg. p. 547, 1849, and Tab. Phyc. viii. 6, t. 12, 1858), in their descriptions add nothing to previous accounts, but the latter figures the habit of the plant, and also a longitudinal and transverse section of the mature thallus.

Both these authors place the genus in *Chordariaceæ*. Kjellmann, in Eng. & Prantl's Nat. Pflanzenfam. Algen. p. 214, 1897, while adding no facts, refers it on account of general resemblances to *Dictyosiphonaceæ*.

The latest account is given by Skottsberg (Kenntn. Subantarkt. Meersalg. I. Phæophyceen Schwed. Südpolar Exp. 1907, p. 48) in describing the algæ collected by the Swedish Antarctic Expedition. As will be seen later, there is some reason to believe that the plant there described is not *S. australis*. He says that the growing-point appears to resemble that of *Dictyosiphon fœniculaceus*, but gives no accurate description. He also says that the thallus is hollow except when quite young; also that it bears no hairs.

The following account is based on an examination of material preserved in spirit, which was placed at my disposal by the courtesy of the authorities of the British Museum, and was sent to them by Mr. R. M. Laing, of Christchurch. The examination

was made by means of series of microtome sections stained with Hoffmann's Blue and supplemented by unstained hand sections.

Mature thallus.—The mature thallus (fig. 1) can be divided roughly into three zones: (1) The innermost, which consists of longitudinally running filaments, sometimes branching and having transverse walls at long intervals, the inner part of the wall of the filament being relatively thick. (2) An intermediate zone of cells which are two or three times as long as broad, and about three times as broad as the central filaments. These cells are joined end to end, so as to form irregular filaments, and are connected into a rough network by lateral projections from the cells. (3) An external zone of radiating moniliform filaments dichotomising regularly towards the outside. The inner cells of neighbouring filaments are joined by projections, so giving the cells a characteristic irregular shape. The outer cells of the filaments are closely adpressed to form a limiting layer. None of these layers are sharply delimited from one another, filaments like those of the central tissue being found extending inwards from cells only two or three layers removed from the outside, while the intermediate layer passes quite gradually into the radiating filaments. The relative proportions of these layers vary according to the age of the thallus, the number of cells in the radiating filaments becoming proportionately much larger in the older parts of the thallus by additions from the limiting layer which remains always meristematic.

In none of the material examined by me was the thallus hollow. This does not, of course, exclude the possibility that other material might be found to be hollow, but one fact observed during the cutting of the sections seems to suggest an explanation of the differences found in this respect. The central filaments form a very loose tissue, easily separable from the rest of the thallus, and when hand sections are cut the middle of them often drops out, thus giving the sections a spuriously hollow appearance. The explanation of this lies in the following fact, that the wall of all the cells consists of two parts: (1) an inner firm one which is nearly as thick in the central tissue as the lumen of the cells is broad, but is thinner in the outer; and (2) an outer very soft gelatinous part which is of very great thickness in the central tissue, but becomes less and less thick in the intermediate tissue, till in the limiting layer it is apparently absent. In consequence of this great thickness of the outer walls the whole thallus, and especially the middle, is very soft and easily separable into individual filaments.

Hairs.—On all parts of the thallus, but especially in the younger parts, are found groups of hairs (figs. 2 and 3). These groups vary in size and frequency, but are in all cases so plentiful that it is difficult to see how they can have been overlooked by Skottsberg, who states (*loc. cit.*) that *Scytothamnus* is distinguished from *Dictyosiphon* in having no hairs. These hairs have no connection with the reproductive organs whatever. They arise close to the apex of the thallus, at a stage when all the tissues are still

growing rapidly. A varying number of peripheral cells cease to divide anticlinally, and for a time also tangentially. The rest of the thallus continues to grow, and thus these cells separate from the neighbouring peripheral cells and from one another, while they become also more elongated, thus originating a slightly depressed group of young hairs (figs. 4 and 5). Rapid transverse divisions now take place at the base of each hair, so that an intercalary growing point is originated, which produces many more cells towards the outside than towards the inside; and these outer cells elongate rapidly, so that the group of hairs projects far beyond the surface. At the same time the surrounding thallus has continued to grow, so that the mature group of hairs occupies a marked depression (figs. 3 and 7).

Growing Point.—Sections were cut of many growing points both longitudinally and transversely, but in no case was any definite apical cell seen. The apex is occupied by a group of meristem resembling neighbouring cells in appearance. In shape they are polygonal prisms, and divisions take place in them parallel to the sides and base (figs. 8, 9 and 10). There is no regular sequence of divisions, and the various tissues are not sharply differentiated in regard to their origin. Rapid divisions in the segments cut off take place for some distance behind the growing point (fig. 11). Division ceases first in the inner tissue and the cells become gradually mature from inside outwards, till in the older parts of the thallus only the limiting layer remains meristematic.

In shape the tip of the branch is always blunt, and this accounts for the fact that the last section of a transverse series is always about a dozen cells in diameter. This is in strong contrast with the form of the apex in *Dictyosiphon fœniculaceus*, in which Murbeck (Vid. Selsk. Skrift. Math. Nat. Klass. Christiania, 1900) found a single apical cell.

The apices of branches vary in appearance according to the activity with which growth is proceeding.

When the branch is quite young its cells remain closely packed and divide actively over a considerable length; but as the branch gets longer and growth becomes less active, the segments divide a decreasing number of times before taking on their mature form and structure, till finally, just before growth ceases, quite a small group of meristem, perhaps eight cells in longitudinal section, is seen. The young cells are readily distinguishable from the older ones by their contents. These in the young cells are dense and uniformly granular; when stained with Hoffmann's Blue the chromatophores are indistinguishable, but the nuclei are noticeable (fig. 11); in the mature cells numerous small oval chromatophores are seen, embedded in a much less deeply-stained protoplasm, while the nuclei are invisible or are only seen with great difficulty (fig. 12).

Sporangia.—These are only found on plants in which growth has stopped. These plants are distinguishable by a rather darker colour, and by a somewhat greater thickness of their ultimate branches.

A section of the tip of any fertile branch (fig. 12) shows that the tissues are quite mature right up to the apex, thus presenting a great contrast with a sterile growing branch, owing to the difference in appearance between young and mature cells above described. The sporangia, which occur all over the surface of the plant, are unilocular, and are modified cells of the limiting layer; they do not appear to arise in acropetal succession, for mature sporangia may be found close to the apex of the same branch in which young stages may be found lower down. It was impossible to find out at what place on the plant development of sporangia first begins, as in the material available mature sporangia are found on all parts of the plant. They are distinguishable in their earliest stage (fig. 13) as cells of the limiting layer which have swollen a little and do not stain quite so deeply. They continue to grow until their shorter diameter is three or four times that of a cell of the limiting layer, and they are somewhat pear-shaped. Then the protoplasm becomes finely vacuolated (fig. 14); these vacuoles swell, and some of them run together, so that they become irregular in shape. After this the protoplasm increases in amount, thus compressing the vacuoles, at the same time it becomes marked out into polygonal areas; these areas are partly bounded by the vacuoles and partly by lines of larger and more deeply-staining granules (fig. 15). Finally, fissures extend inwards from the vacuoles along these lines of granules, so that the polygonal areas become entirely separated and round themselves off to form spores (figs. 16 and 17). The method of dehiscence of the sporangia was not observed.

It will be seen from the above that in the mature structure of the thallus *Scytothamnus* stands between *Dictyosiphonaceæ* and *Chordariaceæ*, while in the position and structure of its sporangia it agrees with the former group. From this group, as at present defined, it differs in the lack of a single apical cell; but so little work has been done on the group that it is impossible to estimate the value of this character, or indeed of any character, in discussing the systematic position of the plant.

It has been thought for a long time that *S. australis* is identical with the plant known as *D. fasciculatus*. The dried material of this species in the National Herbarium was examined, with the result that the type-specimen bearing the following label—"*D. fasciculatus* H. & H. Lord Auckland's Is., J. D. Hooker, Antarct. Exped. 1839-43," was found to differ from *S. australis* in being quite hollow, and in the fact that the peripheral cells, instead of forming radiating moniliform filaments, are joined into a solid parenchyma of rounded cells, in fact the plant had the structure of a true *Dictyosiphon*. The sporangia strongly resemble those of *S. australis*, but so also do those of other species of *Dictyosiphon*. Four other dried specimens—viz., *D. fasciculatus* Hook. et Harv., Eden Harbour, Magellan Straits; *D. fasciculatus*, Kerguelen's Land, 1842, Lieut. A. Smith; *D. fasciculatus*, Falkland Is., J. D. Hooker; *Desmarestia fasciculata*, Campbell Island, No. 43, Dr.

Lyall—were examined, and all agreed with the type-specimen in the structure of the vegetative thallus, but were sterile.

A suggestion having been made that *S. rugulosus* might be identical with *D. fasciculatus*, dried material of that species was also examined. Though it was found to resemble *S. australis* in being solid, yet its peripheral tissue approached a compact parenchyma in structure. The two species are therefore distinct.

In conclusion, I should like to express my indebtedness to the authorities of the British Museum for placing the material at my disposal, and for affording me the facilities for carrying on the work.

Especially am I indebted to Mr. and Mrs. Gepp for the help which they have always been so ready to give, and at whose suggestion the work was begun. My thanks are also due to the authorities of Bedford College for giving me the opportunity to do the work.

DESCRIPTION OF PLATES 490, 491.—1. Longitudinal section of mature thallus, including only a part of the central tissue, × 190. 2. Tip of branch with groups of hairs, × 7·5. 3. Longitudinal section of tip of branch passing through a group of hairs, × 63. 4, 5, 6, 7. Stages in development of a group of hairs, × 281. 8. Longitudinal section of growing point, × 398. 9. Same, showing differentiation of tissues, × 126. 10. Transverse section through growing point, being the last section of a series through the tip of a growing branch, × 281. 11. Seventh section from end in same series as 10. 12. Section through tip of a fertile branch, × 158 Stages in development of sporangia:—13. Initial stage, × 281. 14. Vacuolation, × 569. 15. Cutting out of spores, × 569. 16. Further stage of same, small specimen, × 569. 17. Ripe sporangium, × 281. 18. *Dictyosiphon fasciculatus*, transverse section of thallus from dried material, × 140.

THE FORMS OF *SALVIA VERBENACA* L.

BY H. W. PUGSLEY, B.A.

(Concluded from p. 106.)

THE characters of the foliage of these plants can hardly be considered of equal importance with those of the hair-clothing and calyx, for to some extent they are no doubt of a vegetative nature, and the differences resolve themselves largely into a greater or less degree of sinuation, the outline of the leaf remaining generally more or less broadly oblong or ovate, with margins constantly tending to a blunt serration. The polymorphism of the corolla, which was noticed by Hoffmansegg and Link and also by Bentham and has since been more accurately described by M. Briquet, renders any specific character taken from the form of that organ liable to be fallacious, and its colour, particularly in view of the gradual transitions that evidently are to be found, would appear to be of only secondary consideration. In this connection it is of interest to remark that the two closely allied species, *S. pratensis* L. and *S. lanigera* Poir. (= *S. controversa* auct. non Ten.), are both known to produce dimorphic flowers.

The small corollas of the former resemble those of the large-flowered *S. Verbenaca*, but in my experience do not occur on the same plants as the proterandrous flowers. Another case of a polymorphic corolla among the *Labiatæ* is apparently that of our common *Nepeta Glechoma*.

In view of these facts, then, and as M. Briquet's emphatic observations that all the different forms pass into one another seem to be confirmed by a perusal of the specimens in the National Herbarium, where comparatively few are exactly alike, I am disposed to follow that author in referring the whole of these plants (except *S. multifida*) to one aggregate species, *S. Verbenaca* L., regarding the hair-clothing and the calyx as its most important characters.

The subdivision of this aggregate species I find a matter of some difficulty, which is enhanced by my limited acquaintance with the plants in a living state. The most natural classification, as far as I can judge, is that of the Abbé Coste, modified, in view of the way in which the different forms pass into each other, by the reduction of his three species to the rank of subspecies. This appears preferable to the arrangement proposed in *Les Labiées des Alpes Maritimes*, inasmuch as it seems correctly to make the type of *S. Verbenaca* an intermediate between the *S. clandestina* and *S. horminoides* forms, and does not entirely ignore the floral characters.

It has already been shown that the plant primarily intended in the second edition of the *Species Plantarum* under the name of *S. Verbenaca* is a form of slender growth, with narrow, deeply-cut leaves. And it is unlikely that Linnæus was actually acquainted with the dark-coloured, more robust form that inhabits Great Britain, for had he known it and regarded it as his type, the figure from Barrelier chosen as an illustration would probably have been ic. 167 (afterwards used by St. Amans in his account of *S. pallidiflora*), which is obviously more like our British plant than ic. 208, or the figure of Triumfetti.

With regard to *S. clandestina*, the original description in the *Species Plantarum*, together with Barrelier's ic. 220, suffices to accurately fix it as the dwarfest form in the series with the most deeply-cut leaves and palest flowers.

The position of *S. horminoides* Pourr. is not so clear, but as it is stated to be caulescent and intermediate between *S. Verbenaca* L. and *S. virgata* Jacq., it may be held to be a relatively tall plant. Its leaves are described as crenate and spreading, from which it may be inferred that they are less divided than in *S. Verbenaca* and *S. clandestina*, and resemble those of the British form in lying nearly flat on the ground. It is of interest to remark the likeness in this respect to Barrelier's ic. 167. The coloured calyx and corolla with closed lips—in these features also recalling the British form—seem to indicate a deeply tinted plant with small, cleistogamous corollas, and thus the type of *S. horminoides* is apparently near the end of the series opposite to *S. clandestina*. It is noteworthy that in this instance a plant with cleistogamous flowers is

described as a specific type, as some ground is thus afforded for supposing cleistogamy to be a prevalent state in the district of Narbonne. Moreover, from the remarks of Parlatore and other authors, it is probable that in other districts in South Europe proterandrous flowers are not commonly produced in these tall, dark forms—a view strengthened by an inspection of the specimens in the National Herbarium, where their corollas, so far as can be seen, appear to be generally cleistogamous.

It will further be seen that *S. clandestina* and *S. horminoides*, the two extreme forms of the series primarily included under *S. Verbenaca*, were also the first to be segregated. Hence an additional reason for the retention of the original name for the intermediates arises, as after the separation of the extremes it would naturally stand, under the general rules of nomenclature, for the forms remaining.

The diagnoses of the two types of *S. Verbenaca* and *S. clandestina*, as given by M. Briquet, are both materially different from the Linnean originals, and appear to be derived largely from the *Labiatæ* and De Candolle's *Prodromus*, where Bentham, influenced perhaps by Sir James Smith, in whose herbarium the ordinary broad-leaved British plant figures as *S. Verbenaca*, confines this name to forms with relatively entire leaves, whether narrow or broad, and places all the others, although with some hesitation, under *S. clandestina*, making of the apparent type of this latter plant a variety *multifida*.

If the first three published names be recognized in this way as representing three distinct subspecies, there remains the allocation of those following which stand largely for more or less intermediate forms.

Of these, *S. præcox* "Savi" would appear to present no difficulty, and to be clearly synonymous with *S. clandestina* L., this view being supported by Pisan specimens in the National Herbarium. *S. verbenacoides* Brot. includes an assemblage of forms, with both proterandrous and cleistogamous flowers, varying between the type of *S. Verbenaca* and *S. clandestina*, to the former of which, on the evidence of the specimens in the National Herbarium, *S. collina* Lowe may similarly be referred. The type of *S. polymorpha* Hoffm. & Link, which is well figured by the authors, is a robust form of *S. clandestina*, its varieties tending towards the characters of *S. horminoides* and *S. Verbenaca*. Of *S. controversa* Ten. I have been unable to see satisfactory examples, but there is little doubt but that this has been rightly regarded by Parlatore and M. Briquet as a tall, hairy, narrow-leaved ally of *S. clandestina*, from which, however, it would seem worthy of varietal distinction. It is remarkable as showing the greatest resemblance of all the *Verbenaca* forms to *S. lanigera* Poirr., with which it was formerly identified. The remaining names, *S. oblongata* Vahl and *S. pallidiflora* St. Amans, seem applicable to a comparatively entire-leaved form of the restricted *S. Verbenaca*. Under *S. pallidiflora*, however, two plants appear to be included, the corolla in one being blue, and in the other purple with white spots at the throat. The

blue-flowered form is that afterwards described and figured in Jordan & Fourreau's *Icones* as *Gallitrichum pallidiflorum*, and is represented by a fairly good specimen in the National Herbarium (Billot, no. 1296, sub *S. horminoides*), which shows it to be the restricted *S. Verbenaca* with leaves generally less divided than in the type. This form may be thought to merit distinction as a variety. The purple-flowered *S. pallidiflora* is more doubtful, and may possibly be a form of *S. horminoides*, to which, indeed, the citation of Barrelier's ic. 167 may be held to point.

Among the plants described under new names by later authors, the most noteworthy is the broad-leaved form designated *S. Verbenaca* v. *incisa* by Bentham and v. *horminoides* by M. Briquet, which appears to deserve retention as a separate variety, its leaf-cutting, at least in the extreme states, being very different from that of the typical *S. horminoides* Pourr. To this variety the *Gallitrichum anglicum* of Jordan & Fourreau may also be referred.

It may not be superfluous, perhaps, to point out that Grenier & Godron's *S. horminoides* is not the plant of Pourret, but rather a form of *S. clandestina* L., and that M. Briquet's v. *amplifrons* is practically indistinguishable from the type of *S. horminoides* Pourr.

The arrangement of these plants will therefore stand as follows, *viz.*:—

S. VERBENACA L. Sp. Plant. 1, 25.

Stem simple or branched, pubescent, with admixture of spreading pilose hairs and stalked glands above. Leaves mostly radical, glabrous, except sometimes on the veins below, narrowly oblong to broadly ovate in contour, with margins varying from irregularly pinnatipartite, with serrate-crenate lobes, to bluntly serrate. Calyx large, with broad upper lip and spinescent teeth, clothed with stalked glands and whitish, pilose hairs, the latter especially conspicuous on the pedicels and along the interlabial sinuses. Corolla eglandular and polymorphic, even on the same individual plants, varying from a proterandrous form, in which it ranges to 17 mm. long, with divergent lips, the upper compressed and falcate or galeate in profile and the lower spreading and deflexed, to a cleistogamous form having the corolla only 6 mm. in length, with subequal connivent lips, the upper nearly straight. A characteristic scent emitted from the glands.

Subsp. 1. CLANDESTINA. *S. clandestina* L. Sp. Plant. 2, 36, non ejusdem herb. = *S. præcox* "Savi, Fl. Pis." ex Lois. Not. = *S. clandestina* v. *multifida* Benth. Labiat. gen. et spec. = *S. Verbenaca* v. *multifida* Vis. Fl. Dalm. ap. Briquet in Fl. des Alp. Marit. Exsicc. P. Sint. It. Troj. No. 289 (under *S. Verbenaca* v. *vernalis* Boiss.).

Dwarf in habit; leaves light green, oblong, deeply pinnatifid or pinnatipartite. Calyx very pilose. Corolla pale blue, with middle lobe of the lower lip white.

Var. *angustifolia* DC. Prod. xii. 295. = *S. controversa* Ten. Syll.

Fl. Neap. non Benth. = *S. Verbenaca* v. *controversa* Briquet in Fl. des Alp. Marit.

Taller and more pilose than the subspecific type. Leaves elongate, with usually narrow and distant segments.

Subsp. 2. VERBENACA. *S. Verbenaca* L. Sp. Plant. 2, 35 (sensu restricto) = *S. clandestina* Benth. Labiat. gen. et spec. ex parte non L. = *S. Verbenaca* v. *clandestina* Briquet in Fl. des Alp. Marit. Exsicc. Bourg. Pl. Toul. 313 (sub *S. clandestina*); Bourg. Pl. Canar. 550 (sub *S. clandestina*).

Slender in habit and generally less pilose than subspecies 1. Leaves oblong, usually more than twice as long as broad, irregularly sinuate or pinnatifid. Calyx less pilose and glandular than in subspecies 1, often tinted above with purple. Corolla blue or purple, frequently concolorous.

Var. *oblongifolia* Benth. Labiat. gen. et spec. 240 = *S. oblongata* Vahl Enum. = *S. pallidiflora* St. Am. Fl. Ag. ex parte = *Gallitrichum pallidiflorum* Jord. & Fourr. Icones Fl. Eur. ii. 17 = *S. Verbenaca*, type and v. *oblongata* Briquet in Fl. des Alp. Marit. Exsicc. Billot, No. 1296 (sub *S. horminoides*); Billot, No. 1945 (sub *S. clandestina*).

Leaves almost simply crenate-serrate, less deeply and irregularly divided than in the type.

Subsp. 3. HORMINOIDES. *S. horminoides* Pourr. Chlor. Narb. in Mém. Acad. Toul. iii. 327, non Gren. & Godr. = *S. Verbenaca* Benth. Labiat. gen. et spec. ex parte = *S. Verbenaca* v. *amplifrons* Briquet in Fl. des Alp. Marit. Exsicc. Billot, No. 1944*bis* (sub *S. Verbenaca*).

Tall and robust in habit; stem often reddish or dull purple. Leaves deep green, more spreading than in subspecies 1 and 2, oblong or ovate in outline, usually less than twice as long as broad, bluntly serrate or slightly sinuate, the uppermost generally very broad. Calyx suffused with dull blue-purple, much darker than in preceding subspecies, less pilose above, but with numerous glands. Corolla purple or purplish-blue, often with two white spots at the base of the lower lip; cleistogamous flowers very prevalent.

Var. *incisa* Benth. Labiat. gen. et spec. 240 (pro var. *Verbenaca*) = *Gallitrichum anglicum* Jord. & Fourr. Icones Fl. Eur. ii. 17 = *S. Verbenaca* v. *horminoides* Briquet in Fl. des Alp. Marit. Exsicc. Brand, Salisbury Crags, Edinburgh, 1832.

Leaves incised or pinnatilobed, uppermost often suddenly acuminate and very irregularly divided.

It must not be forgotten that all of the foregoing forms are connected by intermediates, as pointed out by M. Briquet, and in consequence the satisfactory naming of specimens is at times a matter of difficulty, especially when in drying the corollas have become shrivelled or have fallen away. The Exsiccata quoted are to be found in the National Herbarium.

It now remains to return to the original subject of this paper—the identification of the forms found in Great Britain, and it will readily be seen that the plant described at the beginning of this

article as that commonly met with here must be referred to the subspecies *horminoides*. This is equally evident from its habit, its broad and spreading radical leaves, dark-coloured calyces, and inconspicuous corollas.

A considerable degree of variation, however, may be found, particularly in the leaf-cutting, which is certainly much influenced by local conditions, and sometimes shows remarkable differences, even on the same individual. The typical subspecies may be said to be the plant growing in ordinary seasons on the sand-hills at Deal, in which the radical leaves are for the most part broadly ovate, and slightly sinuate with shallow, rounded lobes bluntly serrate along the margins. In dry, exposed situations, the foliage sometimes becomes contracted to a narrower outline, in which the lobing can barely be traced and is reduced to a deep serration. In such cases the lower leaves are not unlike those occurring in *S. Verbenaca* v. *oblongifolia*, which may then be distinguished, *inter alia*, by the uppermost leaves being distinctly narrower. Another quite common form, representing the var. *incisa*, has the radical leaves uniformly pinnatifid, with contiguous, crenate lobes, and sinuses reaching fully half-way to the midrib. Between these extremes every gradation may be found here as on the Continent, the common features in the foliage of these *horminoides* forms that are visible in the herbarium being that the radical leaves are never very narrow, and the uppermost cauline pair invariably very broad.

British examples also show noticeable differences in the pilosity of the stem and the number of its glandular hairs, which are very scarce in some specimens, and extremely abundant in others; but I cannot find that the variations in these respects are in any way correlated with those of other characters.

The calyx in our plants is practically uniform, varying only in size and in the somewhat greater abundance of glands in those examples where the glandular hairs of the stem are most numerous.

Of the corolla, which very frequently shrivels in dried specimens, and often falls away, I have been able to make a series of observations in the field which entirely confirm M. Briquet's statements as to its polymorphism. The descriptions in our British floras seem to overlook this important characteristic (although they note the dimorphic flowers of *S. pratensis*) and are applicable only to a corolla of semi-cleistogamous form which happens to be very prevalent. This polymorphism is not readily seen in most dried specimens, and was not apparent to me on first examining the collection in the National Herbarium; but in September, 1905, when at Newquay, Cornwall, I contrived to recognize, among a number of plants presenting, as I thought, the ordinary appearance of *S. Verbenaca*, one individual with the corollas conspicuously large and exserted, with the lips subequal but divergent, and the upper one distinctly arched, thus according fairly well with the intermediate flower diagnosed by M. Briquet.

In June, 1906, this plant came under my observation at Deal, where I examined a large number of spikes promiscuously gathered, but failed to detect any floral differences, all of the corollas having equal connivent lips much as is shown in the figure of *English Botany*.

During the early summer of 1907 I received fresh specimens gathered near Guildford, and saw the plant growing in quantity in one locality in Middlesex, one in Gloucestershire, and two in Somerset. The Surrey plant, contrary to what I had seen the previous year at Deal, showed different forms of corolla occurring in the same spikes, these forms varying from a small one, 6 mm. long and hardly exceeding the calyx, with equal closely connivent lips and the sexual organs included, to a larger proterandrous state, 10 mm. in length, with the upper lip long, arched, and ascending, and the lower one shorter and deflexed, the style being ultimately exserted. The same admixture of corolla forms occurred in all of the Middlesex, Gloucestershire, and Somerset plants, the length of the largest ones in some cases exceeding 12 mm. These corollas not only differ in size, but as they increase a gradual transition in shape also takes place, from the very small, straight-lipped, closed, cleistogamous form to the largest proterandrous flower with the upper lip long, compressed, and galeate in profile, and the lower one spreading and deflexed. So far as I could ascertain, the proterandrous flowers were to be found only on the central spikes, which flower first, where they were interspersed among other corollas of intermediate form. The lateral branches seemed to produce a mixture of intermediate and cleistogamous flowers. A feature of the corolla which is well seen in the proterandrous flowers, but which is obscured, though still existing, in the smaller closed corollas, is the occurrence of two white spots, surrounded with dark purple, in the throat at the base of the lower lip. This was remarked equally in all of the localities, and is very fairly shown in Jordan and Fourreau's figure of *Gallitrichum anglicum.*

In the following September the same plants in Gloucestershire and Middlesex, being still in bloom, were re-examined, together with others in two spots near Torquay, but at this date no proterandrous flowers whatever could be found, the largest corollas being of a small, intermediate type mingled with an abundance of others evidently cleistogamous.

These observations would seem to show that the form of the corolla in British habitats is not only polymorphic but very irregularly so, and depends largely on the locality and season, with a great prevalence of cleistogamous and semi-cleistogamous flowers at all times and the chief development of proterandrous corollas early in the summer—in all of these particulars agreeing with great exactness with the account of these flowers and their fertilization which we owe to M. Briquet.

The plant growing at the Lizard which arrested my attention in 1902 owing to the size of its flowers is a tall dark form, more than usually glandular, with broad, deeply-cut leaves resembling

those of other British plants which I should refer to *S. horminoides* v. *incisa*. Its chief interest lies in the development of its proterandrous corollas, some of which reach 15 mm. in length. As in the plants which I observed elsewhere during the early summer of 1907 they occur only in the primary spikes, where they are irregularly scattered throughout the whorls among a larger number of more or less smaller and differently shaped flowers. It unfortunately happens that since 1902 I have been unable to see fresh flowering plants which might possibly reveal some character in shape or colouration of the corolla by which to separate this particular form, but seeing that in all respects visible in the herbarium it agrees with other British examples, it seems not unreasonable to assume that the fresh corolla also would present no differences, and I therefore consider that this plant can only be regarded as a form of *S. horminoides* v. *incisa*, with unusually large proterandrous flowers.

It may be thought strange, in view of the large number of botanical visitors to the Lizard, that this plant should not have attracted more attention—a possible explanation of which may be that in recent years it has only been noticed at seasons, perhaps late in the summer, when the proterandrous flowers were wanting, and when it would be indistinguishable from the ordinary state of *S. horminoides* v. *incisa* of other British localities.

The prevalence of semi-cleistogamous and cleistogamous flowers in all of these plants in Britain may possibly be attributable to our geographical position as a northern outlier of the range of a species whose headquarters lie round the Mediterranean.

If all of the plants found in Britain be thus referred to *S. horminoides*, the only form still to be treated is that growing at Vazon Bay, Guernsey, formerly referred to *S. clandestina* L. by Syme and other authors, and described in this Journal for 1906 as a new species, *S. Marquandii* Druce. Of this plant I have been enabled, through the kindness of Mr. Arthur Bennett, to examine a good series of specimens, consisting of five gatherings (by W. W. Reeves, M. Dawber, and Mr. Druce), dating from 1877 to 1889; and last July I was indebted to Mr. E. D. Marquand for a fine set of living plants, both wild and from the garden. In addition, I possess an authentic specimen, dated July, 1906, from Mr. Druce.

As diagnosed by Mr. Druce, who omits all reference to the allies of *S. Verbenaca* except *S. clandestina* and the Gallitrichums, this new species may be separated from *S. pratensis* by its much smaller and eglandular flowers; from *S. clandestina* by its blue concolorous flowers, differently shaped corollas, and less rugose and less divided leaves; and from *S. Verbenaca* by its differently shaped lighter blue flowers, paler, narrower leaves, less spiny calyx-teeth, absence of viscosity owing to scarcity of glandular hairs, and by its different odour.

There would appear to be no difficulty in distinguishing *S. Marquandii* from *S. pratensis*, as it has obviously not only the

much smaller and eglandular corolla but both the calyx and the hair-clothing of the *Verbenaca* group.

From *S. clandestina* it does not present such marked differences, but, as stated by Mr. Druce, its concolorous flower and different foliage should suffice to make any confusion impossible.

As compared with the common British plant which it is proposed to identify with *S. horminoides* Pourr., the Vazon Bay Salvia is a slender, light-coloured form, with narrow, betony-like leaves, coarsely serrate-crenate, but showing little tendency to sinuation, and the upper never conspicuously broad; while, further, judging from the material at my disposal, the radical rosette is less spreading and less persistent. The degree of viscosity of the stem is variable, but, on an average, probably less than that of *S. horminoides*, and none of the specimens that I have seen show such an abundance of glands as the plant at the Lizard. Three of Mr. Bennett's specimens are less glandular and hairy than any of my British examples; while the remaining two, taken in different years, and also Mr. Druce's, are more pilose, and possess fairly numerous glands. Mr. Marquand's gathering is likewise variable in this respect.

It is presumably to these glands, which, as in other *Verbenaca* forms, occur on the calyx in greater profusion than on the stem, that the scent of these plants is due, and as the foliage of all of them, so far as I can trace, is quite eglandular, it should consequently be also odourless, the scent proceeding solely from the glandular inflorescence. According to Mr. Druce, the whole plant of *S. Marquandii* smells "of calamint, quite different from the heavy odour of *S. Verbenaca*," but on testing Mr. Marquand's fresh specimens with others obtained the same day from Hampton Court, I found that in both cases the scent was confined to the inflorescence, and the chief difference seemed to be that that of the British plant was much the stronger, which might be attributable simply to a greater glandular development. The glands of *S. Marquandii*, however, like those of some Continental specimens referable to the restricted *S. Verbenaca*, appear smaller, and may prove structurally different from those of our ordinary Clary, and it is possible that the odour, in addition to being fainter, is also slightly different, although there is no marked contrast, such as is perceived on comparing fresh specimens of *S. horminoides* and *S. pratensis*.

It will be remembered that some of the French botanists have noted variations of scent in the Salvias of this group, but their remarks throw little light on our British plants, their principal conclusion being that the *clandestina* forms, which often are very glandular, possess the strongest odour.

The calyx of *S. Marquandii* is distinguished by its author from that of *S. Verbenaca* by its less spiny teeth, and is stated to be only 5–6 mm. long. This does not hold good with my *Marquandii* material, for on comparing it with a large number of British specimens I quite fail to find, after allowing for enlargement in fruit, any difference in the teeth or yet in the size of the calyx,

which, when fully developed, is 9–10 mm. in length in all of the specimens. There are minor divergencies, however, in other respects, the calyx of *S. Marquandii* being much lighter in colour, suffused generally with a pinkish purple, with the upper lip a little narrower and a trifle recurved upwards at the apex after the fashion of *S. pratensis*. The glands of the upper lip, also, are fewer and on longer stalks, and are freely interspersed with much longer pilose hairs than are met with on the upper side of the calyx in the British plants.

The comparison of the corolla of *S. Marquandii* with that of the Hampton Court form proved most interesting. In Mr. Marquand's specimens, which are unbranched, this organ was uniformly proterandrous, from 12 to nearly 15 mm. in total length, with the upper lip galeate in profile and the lower spreading and deflexed. The smaller flowers were indistinguishable in shape from Middlesex corollas of the same length, except for a slightly greater contraction of the throat within the calyx; and the chief difference in colour lay in the corolla of the Guernsey plant being wholly concolorous, without the white spots at the throat, and its hue somewhat brighter and more tinged with lilac. Mr. Marquand's largest flowers showed a slightly longer upper lip, and closely approximated to the large corollas of the Lizard plant of 1902.

But this type of corolla is not invariably produced in *S. Marquandii*, for one of Mr. Bennett's specimens (W. W. Reeves, August, 1888) shows smaller and differently shaped corollas, not exceeding 10 mm. on the central spike; and in another (M. Dawber, May, 1886) the lateral branches present nothing but small flowers, some of which are of semi-cleistogamous form, and only 7 mm. long. It is thus evident that this plant is subject to the same polymorphism of the corolla as other *Verbenaca* forms, although it produces a much greater proportion of proterandrous flowers than we are accustomed to see in Britain.

From these considerations it will be seen that this Salvia cannot be named *S. horminoides*, but agrees essentially in its slender habit and narrow leaves with the restricted *S. Verbenaca*, of which it may be regarded as a form with slightly cut foliage, referable to the variety *oblongifolia* Benth. It is without doubt extremely like the blue-flowered form of *S. pallidiflora* St. Am., quoted as a synonym of that variety, and seems to me identical in every respect with the Agen specimen in the National Herb. labelled "Billot, No. 1296, *S. horminoides* Pourr. (= *S. pallidiflora* St. Am.)," and with the figure and description of the same plant, *Gallitrichum pallidiflorum*, in Jordan & Fourreau's *Icones*, both the specimen and the figure showing not only the same habit, foliage, and corolla-colouring, but even the same peculiarities of the form, glands, and pilosity of the calyx.

If this be admitted, it may be considered that of the forms shown in the foregoing clavis we have in Britain the subspecies *S. horminoides* Pourr. connected with its variety *incisa* Benth. by various intermediates, and usually producing cleistogamous or

semi-cleistogamous flowers, but sometimes also larger proterandrous ones, which, at the Lizard, have given rise to the record of *S. clandestina* L. for Cornwall. And, further, in addition to these forms, there occurs in Guernsey a slender narrow-leaved plant, with more generally proterandrous flowers, which was also mistaken for *S. clandestina* L., but which really approximates to the true *S. Verbenaca* L., and is best referred to its entire-leaved variety *oblongifolia* Benth.

This will necessitate the addition of *S. Verbenaca* auct. angl. to the synonymy of *S. horminoides* Pourr., and of *S. clandestina* Syme and *S. Marquandii* Druce to that of *S. Verbenaca* L. var. *oblongifolia* Benth.

NEW OR CRITICAL BRITISH FUNGI.

By George Massee, F.L.S.

Thelephoraceæ.

Hypochnus solani Prill. & Del. in Bull. Soc. Myc. France, vii. 220 (1891); Sacc. Syll. Fung. xi. 130 (1905).

Corticium vagum Berk. & Curt. var. *solani* Burt. in Colorado Agric. Bull. Nos. 70 and 91.

Hyphasma effused, thin, about 150 μ thick, slightly granular, cracked when dry, greyish-white, internally tinged brown, scarcely adhering to the cuticle. *Basidia* broadly club-shaped, apex rounded, 10–20 × 18 μ, sterigmata four, straight, cylindrical, 3 × 2·5 μ. Spores elliptical with an apiculus at the base, hyaline, 10 × 6 μ.

On the lower portion of living potato-haulms. Mortlake, Surrey. Previously recorded from Grignon, Savoy, and the United States.

Forming a thin greyish-white weft on the living haulm; although parasitic, no injury has been experienced from its presence. Rolfs considers this fungus to represent the fruiting condition of *Rhizoctonia*. This point is discussed in detail under the next species.

Sphæriaceæ.

Leptosphæria circinans Saccardo, Syll. Fung. ii. 88 (1883).

Byssothecium circinans Fuckel in Bot. Zeit. xix. 251, t. 10, fig. 8 (1861); Fuckel, Symb. Mycol. 142 (1869).

Exsicc. Kunze, Fung. Sel. Exs. No. 259; Briosi e Cavara, Fung. Parasit. No. 225.

Perithecia erumpent, more or less scattered, often seated amongst a weft of reddish or violet-coloured mycelium, globose with a slightly protruding mouth, black, glabrous, 100–150 μ diam. *Asci* cylindric-clavate, 8-spored, spores irregularly distichous, elliptical, 3-septate, slightly constricted at the middle septum, the two interior cells large, violet-brown, terminal cells small, hyaline, 32–35 × 10–12 μ. *Paraphyses* slender, hyaline. Pycnidium stage

(= *Hendersonia medicaginis* Saccardo, Syll. Fung. ii. 88 (1883)). *Perithecia* globose, black, rugulose, without a definite mouth, about 150 μ diam., half buried in a dense weft of reddish or purplish mycelium (*Rhizoctonia*) ; spores exactly as in the ascigerous form, borne on short, slender, hyaline sporophores.

On base of stem of lucerne, *Medicago sativa* L., Herne Bay.

The fungus was found on lucerne sent to Kew by Mr. E. S. Salmon, F.L.S., of Wye College, to illustrate the action of the parasitic fungus *Urophlyctis alfalfæ* Magn. in producing "crown gall" at the collar.

Leptosphæria circinans Sacc. is considered by most Continental mycologists as the fruit of the well-known brown or reddish-violet vegetative mycelium called *Rhizoctonia violacea* by Tulasne, which often proves so destructive to lucerne, saffron, potatoes, &c., covering the root or bulb with a dense felt of mycelium, which does not, as a rule, produce fruit until after the host-plant is on the wane or quite dead. In this condition *Rhizoctonia* is common throughout Europe, and is also known in the United States. Professor Rolfs (Colorado Agric. Bull. Nos. 70 and 91), on the other hand, considers that the fruiting condition of *Rhizoctonia violacea* is a Basidiomycete, *Corticium vagum* Berk. & Curt. var. *solani* Burt. Now *C. vagum* proper is saprophytic on the dead bark of conifers, hence much latitude is necessary to enable the so-called variety *solani* to become a rampant parasite on the roots of a great number of different kinds of plants, growing in parts of the world where *C. vagum* is unknown. The American *C. vagum* Berk. & Curt. var. *solani* Burt. is *Hypochinus solani* Prill. & Del. (see preceding).

Uredinaceæ.

Puccinia Cardui-pycnocephali Sydow, Mon. Ured. i. 34, t. 3, fig. 35 (1902) ; Saccardo, Syll. Fung. xvii. 291 (1905).

Exsicc. Sacc. Myc. Ital. No. 1085.

Uredospore sori hypophyllous, scattered, minute, pale brown, not causing discoloured spots. *Uredospores* globose or subglobose, very minutely echinulate, pale brown, 22–26 μ diam. *Teleutospore sori* hypophyllous, scattered, minute and almost hidden in the tomentum of the leaf, not forming discoloured spots, brown, somewhat darker than the uredospore sori. *Teleutospores* oblong, apex rounded, not thickened, not at all or only very slightly constricted at the median septum, base rounded, epispore thin, smooth, pale brown, 38–50 × 16–23 μ, pedicel hyaline, slender, deciduous, up to 40 μ long.

On living leaves and stem of *Carduus pycnocephalus* L. First observed in this country by Dr. Eng. Mayor, at Sidmouth, July, 1907. During August of the same year I collected this fungus in abundance on the same host along the coast-line between Eastbourne and Hastings.

Previously only recorded from Italy on *C. pycnocephalus* L.

Some specimens collected agree well with the diagnosis given above, while other specimens approach very closely to a second

new species of *Puccinia*, described by Sydow as parasitic upon *Carduus pycnocephalus* L.—*P. galatica* Syd. I should consider *P. cardui-pycnocephali* Syd. and *P. galatica* Syd. as representing the two poles of one species, rather than as two distinct species parasitic on the same species of host-plant.

The following is Sydow's diagnosis of *P. galatica*:—

Teleutospore sori occurring on both surfaces of the leaf, not forming discoloured spots, scattered or gregarious, minute, black, becoming pulverulent. *Teleutospores* elliptical, ends rounded, apex not thickened, generally slightly constricted at the median septum, dusky brown, epispore about 3 μ thick, delicately punctate, 30–45 $\times$ 22–28 μ, pedicel hyaline, slender, up to 30 μ long. *Uredospores* are found mixed with the teleutospores, subglobose to globose, pale brown, minutely echinulate, 22–28 μ diam.

On living leaves of *Carduus pycnocephalus* L. var. *albidus*. Asia Minor.

Distinguished from *P. cardui-pycnocephali* Syd. by the slightly smaller, darker-coloured, thick-walled teleutospores.

Puccinia Pazschkei Dietel in Hedwigia, xxx. 103 (1891); Ber. d. Bot. Ges. ix. 44, t. 3, fig. 15 (1891); Saccardo, Syll. Fung. xi. 185 (1895); Sydow, Mon. Ured. i. 505, pl. 30, fig. 411 (1903).

Teleutospore sori epiphyllous, rarely hypophyllous, commonly arranged in irregular concentric circles, here and there scattered, circular, margined by an irregular fringe of the ruptured epidermis, becoming pulverulent, dark brown. *Teleutospores* elliptic-oblong, rounded at both ends, slightly constricted at the median septum, apex very slightly thickened, not papillate, epispore pale clear brown, distinctly warted, 30–45 $\times$ 15–20 μ, pedicel hyaline, slender, about equalling the spore in length.

On living leaves of *Saxifraga longifolia* Lapeyr. Kew Gardens. Previously only known from Switzerland and Austria, parasitic upon *Saxifraga Aizoon* Jacq., *S. Hostii* Tausch., and *S. longifolia* Lapeyr.

In this country the present species has previously been included under *Puccinia Saxifragæ* Schlecht., from which it differs in having the teleutospore warted instead of striate, and in other characters.

P. Huyteri Sydow will in all probability be found in this country. It differs from *S. Saxifragæ* in the smaller teleutospores being furnished with a rather long acute papilla, and in having the surface punctate and not striate. It occurs on living leaves of *Saxifraga mutata* L. and *S. oppositifolia* Lapeyr. in Norway and Austria.

Æcidium phillyreæ DC. Flor. France, v. (vi.) 96 (1815); Saccardo, Syll. Fung. vii. 807 (1888).

A. crassum Pers. Syn. Fung. 208 (1801), var. *phillyreæ* Cooke, Handb. Brit. Fung. 539 (1871).

Exsicc. Vize, Micro-Fung. Brit. No. 236; Roumeg. Fung. Gall. Exs. No. 3023; Thürn. Myc. Univ. No. 1717.

Pseudoperidia numerous and densely crowded, margin torn or

nearly entire, more or less involute, whitish, æcidiospores subglobose or somewhat irregular in form from mutual pressure, wall colourless, minutely warted, contents deep orange-yellow, 25–35 μ diam.

On leaves and young shoots of *Phillyrea latifolia* L., Pevensey Churchyard, Sussex, August, 1907.

Every shoot of the year, including the leaves, was attacked and contorted by the parasite, and during the month of August were rendered conspicuous by the copious development of orange spores; hence the pardonable mistake on the part of a local scientist in stating that this was the first occasion on which the bush had produced flowers.

A. phillyreæ has occurred on one previous occasion in England, being collected by Mr. F. Paxton, near Chichester, on *Phillyrea media* L. The specimens were submitted to Dr. M. C. Cooke, who included the fungus in his Handbook as var. *phillyreæ* of *Æcidium crassum* Pers. No diagnosis of this variety was given, hence the species has not become generally known to British mycologists.

The occurrence of the fungus in this country is influenced by that of its host-plants, which rank as introduced ornamental shrubs. It is recorded from France, Germany, Italy, and Algeria.

Puccinia obtegens Tulasne in Ann. Sci. Nat. ser. 4, ii. 87 (1854).

According to the law of priority the above name must replace the more familiar *P. suaveolens* Rostr., as shown by the following synonymy :—

Cæoma obtegens Link Obs. ii. 27 (1791).

Uredo suaveolens Pers. Obs. Myc. ii. 24 (1796).

P. obtegens is parasitic on the leaves and stem of *Cnicus arvensis* Hoffm. The mycelium of the fungus hybernates in the rootstock of the host, hence when a plant is once infected it remains diseased for all time. Diseased plants appear sooner in the season than healthy ones, and are readily recognized by the sickly pale green colour and upright leaves; no flowers are produced.

As diseased plants do not produce seed, a systematic infection of healthy plants, which is readily effected, would rid the country of one of the most injurious of weeds.

Mucedinaceæ.

Scopulariopsis communis Bainier in Bull. Soc. Myc. France, xxiii. 127, t. 16, figs. 3–6 (1907).

Hyphasma consisting of crowded strands of mycelium matted together and forming an effused prostrate, snow-white pile; fertile branches short, rising erect, slightly clavate; conidiophores 5–8, elongate, clavate, springing as an apical tuft from the fertile branch. Each conidiophore bears a chain of basipetally formed, elliptical, smooth, hyaline conidia, 7–8 × 4–6 μ. (Plate 489, fig. A.)

On decaying herbaceous stems, Ealing.

The genus *Scopulariopsis* is new to the British flora. Its

nearest affinity is with *Penicillium*, from which it differs in the very short fertile branches which rise erect at intervals from prostrate vegetative hyphæ. The conidiophores are also relatively more elongated than in *Penicillium*.

Whether *Scopulariopsis* is an entity or simply a phase in the life-cycle of some other fungus remains to be proved.

THE ERLANGEAS OF § BOTHRIOCLINE.

By Spencer le M. Moore, B.Sc., F.L.S.

We first hear of *Bothriocline* in the early seventies of the bygone century, when the genus so named was established by Professor Oliver upon the remarkable plant he called *Bothriocline Schimperi* (Ic. Pl. sub tab. 1133). Shortly afterwards (in Fl. Trop. Afr. iii. p. 266) the conception of the species was enlarged by including in it two supposed varieties, var. *tomentosa* and var. *longipes*, and the genus remained thus monotypic until in 1894 Mr. N. E. Brown (Kew Bull. 1894, p. 389) raised the last-named variety to specific rank as *B. longipes*, at the same time describing a third species (*B. laxa*). This latter has many of its leaves alternate; and since one of the chief characteristics of *B. Schimperi* is the opposition or ternation of its leaves, Dr. Hoffmann (Engler, Pflanzenw. Ost-Afr. C. p. 402) was naturally led to abandon that characteristic as a *sine qua non*. Moreover certain plants having the curious achenes and caducous pappus of *Bothriocline*, but because of their general facies and alternate leaves hitherto included in *Vernonia*, were logically transferred by him to *Bothriocline*, which thus received some accession to its numbers. So matters stood, a species being added here and there, until in 1902 I endeavoured to show that no sufficient reason remained to justify the separation of *Bothriocline* from the older *Erlangea*; and, inasmuch as Dr. Hoffmann has accepted this view, the matter may be considered as settled.

Recent study of the British Museum material has convinced me not only that the published varieties of *B. Schimperi*, but that three other forms provisionally referred to it differ so much among themselves as to point to their specific distinctness. In thus concluding I traverse Mr. Hiern's valuable opinion, who (Cat. Welw. Pl. pt. iii. p. 515) has added as further varieties to *B. Schimperi* two Angola plants which, although the foliage is much alike in all three, seem to me widely different from the type in inflorescence and capitula. In their promotion to specific rank the two varieties just mentioned are joined by the var. *tomentosa*; and when to these one adds a plant from Mt. Ruwenzori, another from British East Africa, a third from Mt. Milanji, the two Mr. Brown described, and lastly another for which I am responsible, we find the section to comprise no fewer than ten, as is here maintained, perfectly distinct species. The following key gives some of the points by which these species can be distinguished. Before

this is given it may be mentioned incidentally that I find specimens with all the leaves opposite to be very rare indeed, the usual thing being for at least one, if not two or even more, of the highest to arise unpaired.

Mature leaves glabrous or at most puberulous beneath :—
  Inner involucral leaves scarious and purple in their upper portion :—
    Cymes rather densely-headed, the stout tomentose proper peduncles rarely longer than the capitula. Involucral leaves with conspicuous scarious edging. Heads with about 40 florets. Corollas 0·9 cm. long . . . . *E. Schimperi.*
    Cymes of few loosely-arranged heads, the slender proper peduncles usually longer than the heads, and pilose or puberulous. Scarious edging of the involucral leaves not conspicuous. Heads with not more than 25 florets. Corollas 0·5–0·6 cm. long :—
      Involucres campanulate, the leaves green and glossy and somewhat lengthily acuminate . . . . *E. laxa.*
      Involucres cylindrico-campanulate, the leaves dull and at most acute . . . . . *E. angolensis.*
  Inner leaves of involucre concolorous with outer (never purple) :—
    Cymes many-headed. Outermost involucral leaves broad. Heads with not more than 20 florets :—
      Leaves oblong-lanceolate. Involucral leaves for the most part very obtuse . . . . . *E. milanjiensis.*
      Leaves elliptical. Involucral leaves obtuse or acute *E. longipes.*
    Cymes of few laxly-arranged heads. Outermost involucral leaves much narrower than the inner. Heads with about 50 florets . . . . . *E. huillensis.*

Mature leaves pubescent beneath :—
  Leaves elliptical. Cymes tomentose, shorter than the leaves, the small heads very densely aggregated . . . *E. spissa.*
  Leaves lanceolate. Cymes densely pubescent, longer than the leaves, the medium-sized heads somewhat closely aggregated . . . . . *E. pubescens.*

Mature leaves tomentose below :—
  Upper side of leaf green. Cymes tomentose. Leaves of involucre conspicuously scarious-edged. Heads with about 40 florets . . . . . *E. tomentosa.*
  Upper side of leaf black, at least when dry. Cymes pubescent. Leaves of involucre not conspicuously scarious-edged. Heads with at most 25 florets . . . . . *E. fusca.*

The specific characters are given in more detail in the descriptions which follow.

E. angolensis, sp. nov. Herba elata, circa orgyalis, ramulis quadrangularibus plane costatis inter costas pubescentibus subinde puberulis, foliis plerumque alternis rarius oppositis oblongo-oblanceolatis acuminatis basi in petiolum brevem pubescentem

puberulumvé desinentibus margine inæqualiter serratis tenuiter membranaceis supra pilis strigosis appressis munitis subtus costis costulisque appresse pubescentibus, capitulis 25-flosculosis in cymis sat effusis pluricephalis folia excedentibus dispositis, pedunculis propriis gracilibus sæpissime capitula excedentibus, involucri cylindrico-campanulati 4-serialis phyllis exterioribus ovato-lanceolatis quam interiora lanceolata sursum scariosa brevioribus omnibus acutis, flosculis exsertis, corollæ tubo fere a basi ampliato, achæniis anguste obovoideo-oblongis 5-costatis, pappi setis caducissimis scabriusculis. — *Bothriocline Schimperi* var. *angolensis* Hiern, *op. cit.*

Hab. Pungo Andongo; *Welwitsch*, 4002.

Folia 6·0–9·0 cm. long., 2·0–3·5 cm. lat., in sicco brunneo-viridia, subtus pallidiora; petioli circa 1·0 cm. long. Cymæ evolutæ circa 14·0 cm. long., plurirameæ. Pedunculi proprii sæpe fere 1·5 cm. long. Involucri phylla exteriora 0·2–0·4 cm., interiora 0·65 cm. long., hæc dimidio superiore dilute punicea. Corollæ 0·6 cm. long.; lobi 0·2 cm. Achænia 0·15 × 0·07 cm. Pappi setæ 0·15 cm. long.

E. milanjiensis, sp. nov. Caule erecto tetragono puberulo ramulis ultimis pubescentibus cito puberulis, foliis oppositis vel paucis summis alternis lanceolato-oblongis acutis vel breviter acuminatis deorsum in petiolum brevem gradatim angustatis margine serrulatis membranaceis utrinque puberulis sed statu juvenili fac. inf. pubescentibus, capitulis campanulatis 12–16-flosculosis in cymis ramosis sublaxis polycephalis digestis, involucri 4-serialis phyllis oblongo-ovatis (intimis oblongis) plerumque obtusissimis interioribus quam exteriora longioribus, corollis a medio ampliatis, achæniis oblongo-turbinatis, pappi setis caducissimis scabriusculis.

Hab. Nyassaland, Mt. Milanji, at 6000 ft.; *A. Whyte.*

Folia 6·0–11·0 cm. long., 2·0–2·5 cm. lat., juvenilia ± 5·0 × 1·3 cm., in sicco brunneo-olivacea; petioli circa 0·5 cm. long., pubescentes. Cymæ circa 8·0 cm. long., pubescentes. Involucra 0·5 × 0·4 cm.; phylla exteriora 0·2–0·3 cm., interiora 0·45 cm. long. Corollæ 0·6 cm. long.; lobi 0·25 cm. Achænia 0·12 cm. long., pappi setæ 0·2 cm. long.

E. huillensis, sp. nov. Caule erecto mox scabriusculo, ramulis primo hispidulo-puberulis, foliis inferioribus oppositis superioribus sæpe alternis ovalibus vel oblongo-lanceolatis breviter acuminatis basi in petiolum gradatim extenuatis margine dentato-serratis tenuiter membranaceis utrobique cito fere glabris, capitulis circa 50-flosculosis in cymis laxis paucicephalis hispidulis dispositis, involucri hemisphærici 4-serialis phyllis ovato-oblongis breviter spinuloso-acuminatis (extimis comparate elongatis lanceolatis acuminatis sursum membranaceis) margine ciliatis vel ciliolatis interioribus margine angustissime scariosis, flosculis exsertis, corollæ tubo a medio amplificato, acheniis cylindrico-oblongis alte 5-sulcatis, pappi setis caducissimis scabriusculis.— *Bothriocline Schimperi* var. *huillensis* Hiern, *op. cit.*

Hab. Huilla; *Welwitsch*, 4003.

Folia solemniter 6·0–9·0 cm. long., 2·0–3·5 cm. lat., in sicco viridia, subtus viridi-grisea; petioli lati, hispiduli, 0·5–1·0 cm. long. Cymæ adusque 10·0 cm. long., sæpissime vero breviores. Pedunculi proprii capitulorum profecto evolutorum 0·5–1·5 cm. long. Involucra 0·65 × 0·65 cm.; horum phylla extima 0·5 cm. interiora 0·6 cm. long., omnia dorso glandulis paucis rubentibus onusta. Corollæ 0·45–0·5 cm. long.; lobi 0·12 cm. long. Achænia 0·175 × 0·08 cm.; pappi setæ 0·2 cm. long.

E. pubescens, sp. nov. Erecta caule ramoso subtereti ad nodos aliquantulum tumido brunneo-pubescente, foliis oppositis paucis summis alternis manifeste petiolatis lanceolatis acutis basi obtusis subrotundatisve margine serratis membranaceis supra ad costam centralem pubescentibus ceterum puberulis subtus dense pubescentibus, capitulis ± 12-flosculosis sæpissime sessilibus in glomerulis pluricephalis longipedunculatis ut novellæ tomentosis dispositis, involucri cylindrico-campanulati 4-serialis phyllis exterioribus ovato-oblongis obtusis vel obtusissimis quam interiora oblongo-lanceolata acuta brevioribus fere omnibus anguste scarioso-marginatis, flosculis exsertis, corollæ tubo basi angusto paullo supra basin indeque usque ad fauces gradatim dilatato, acheniis turbinatis 5-costatis, pappi setis paucis caducissimis scabridis.

Hab. Mt. Ruwenzori, at 5300 ft.; *Scott Elliot*, 7536. Ruwenzori, east side, at 6000 ft.; *Wollaston*.

Herba sec. cl. Wollaston 1¼-fere 4-metralis. Foliorum limbus 4·5–7·0 cm. long., 1·5–3·0 cm. lat.; petioli sæpissime 1·0–1·5 cm. long., late canaliculati, dorso dense pubescentes. Inflorescentiæ 6·0–9·0 cm. long. Involucra 0·45 × 0·35 cm.; phylla exteriora 0·15–0·25 cm., interiora 0·45 cm. long. Corollæ 0·6–0·65 cm. long., lobi 0·2 cm. Achænia 0·075 cm. long., juxta medium 0·05 cm. lat. Pappi setæ 0·12 cm. long.

Dr. Wollaston's specimens, having been laid aside for further examination, were overlooked when the recent memoir (Journ. Linn. Soc. xxxviii. pp. 228–278) on the plants of the late Ruwenzori Expedition was in preparation.

E. tomentosa, sp. nov. Ramis sat crebro foliosis villoso-tomentosis deinde villosulis, foliis brevipetiolatis oppositis summis raro alternis oblongis vel oblongo- vel ovato-lanceolatis obtusis basi rotundatis subrotundatisve margine serratis vel serrulatis supra villoso-pubescentibus tandem scabridis subtus villoso-tomentosis, capitulis circa 40-flosculosis sessilibus breviterve pedunculatis in glomerulis spissis sat longipedunculatis dense tomentosis dispositis, involucri hemisphærici basi piloso-pubescentis 4-serialis phyllis ovatis acutis margine scariosis, flosculis exsertis, corollæ tubo ultra medium leviter ampliato, achæniis turbinatis 5-costatis, pappi setis scabridis caducissimis.—*Bothriocline Schimperi* var. *tomentosa* Oliv. & Hiern in Fl. Trop. Afr. iii. p. 266.

Hab. Kilimanjaro; *New*. Mau, at 7–8000 ft.; *Scott Elliot*, 6806. Sotik; *Jackson*.

Folia 4·0–6·0 cm. long., 1·7–2·5 cm. lat., exstant minora juvenilia circa 2·0 × 1·5 cm.; petioli 0·5 cm. long., villoso-tomentosi. Inflorescentiæ adusque 10·0 cm. long., sæpe vero breviores. Pedun-

culi proprii summum 0·3–0·4 cm. long. Involucri phylla exteriora 0·175–0·2 cm. long.; interiora usque ad 0·4 cm. long. Corollæ in toto 0·5 cm. long., lobi 0·2 cm. Achænia 0·12 cm. long., pappi setæ 0·15 cm.

E. fusca, sp. nov. Caule subtereti longitrorsum costato inter costas griseo-pubescente, foliis oppositis brevipetiolatis oblongis obtusis basi rotundatis margine serratis pergamaceis fac. sup. fere glabris saltem in sicco fuscis fac. inf. griseo-tomentosis, capitulis circa 25-flosculosis sessilibus vel breviter pedunculatis ad apices pedunculi ramosi pubescentis glomeratis, involucri anguste campanulati 4-serialis phyllis ovato-oblongis obtusis margine anguste scariosis extimis abbreviatis et dorso pubescentibus, flosculis exsertis, corollæ tubo a medio amplificato, achæniis cylindricis apice dilatatis, pappi setis scabridis caducissimis.

Hab. British East Africa, Kikuyu; *Jackson*.

Folia superiora solummodo visa 2·0–4·0 cm. long., 0·8–2·0 cm. lat. Inflorescentia circa 6·0 cm. long. Involucra 0·5 cm. long.; phylla in sicco brunnea, sub apice nigra, extima 0·175–0·2 cm., intermedia 0·25–0·3 cm., intima 0·4–0·45 cm. long. Corolla in toto 0·6 cm. long.; lobi 0·15 cm. Achænia 0·1 × 0·14 cm.; pappi setæ 0·12 cm. long.*

The genus itself differs from *Vernonia* only in the curious reduced achenes and the pappus of few, short, very caducous setæ. This reduction of the achenes seems correlated with that of the pappus; but the latter, owing to its extremely frail attachment to the achene, cannot function as its carrier. May it be that the setæ serve to keep the florets distinct from one another, so as to render pollination more certain? Against this we should remember that the pappus of *Gutenbergia* has completely disappeared; the florets therefore of that closely-allied genus suffer no injury from wanting a pappus. The reduction in the pappus may possibly be of advantage in preventing the liberated achenes from straying too far, and so causing the flowers to run less chance of cross-fertilization. Obviously this reduction would be more efficacious if the achenes underwent diminution in size while the pappus was still unreduced.

Although monotypic up to a few years ago, to-day the genus is one of no fewer than thirty-two species, all African except one from New Guinea—a good instance, this, of the rapid increase in our recent knowledge of the African flora. It is also interesting from the fact that, as concerns the principle upon which it is sectioned, to some extent it coincides with *Vernonia*, and this seems to point to its multiple origin—to its being, in fact, an artificial and not, if the term may be allowed, a genetic genus.

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* Since writing the above I have seen at Kew better specimens of this species (British East Africa, Aberdare Mts.; *Sir Evan James*. Upper Mau Plateau; *A. Whyte*). The largest leaves of these measure 8·5 cm. in length, and are 3·5 cm. broad.

NOTES ON *POTAMOGETON*.

By Arthur Bennett, F.L.S.

(Continued from Journ. Bot. 1907, p. 377.)

× Potamogeton Cooperi (= *crispus* × *perfoliatus*) Fryer in Bot. Exch. Club Rep. for 1895 (5 June, 1897); Pot. Brit. Isles, 48, tt. 31, 32 (1900).

P. perfoliatus var. *Jacksoni* F. A. Lees in Bot. Rec. Club Report for 1880, 150 (1882).

P. undulatus v. *Cooperi* Fryer in Journ. Bot. 1891, 289, t. 313; Cooper in Trans. Leic. Lit. Soc. iii. 397 (1894).

× *P. cymatodes* Aschers. & Graebn. Syn. Mitteleur. Fl. i. 337 (27 Aug. 1897).

Mr. Fryer's name clearly takes precedence over *P. cymatodes*. Ascherson and Graebner place it as *P. perfoliatus* × *crispus*, while Mr. Fryer gives it as *crispus* × *perfoliatus*, his reason for so doing being founded on careful observations of the plant in the field and in cultivation.

Mr. Fryer at first referred this to *P. undulatus* Wolfg. = *P. crispus* × *prælongus* Caspary; but this was corrected by Baagöe in Bot. Tidsskr. xxi. 221, t. 7 (1897). The plant of Wolfgang was grown by Caspary, who satisfied himself by cultivation his specimens were nearer *crispus* than *prælongus*. Baagöe showed by anatomical characters that our plant could not be that of Wolfgang, gathered by him in Lithuania. Baagöe found it in Denmark, and sent me a beautiful series; Caspary in West and East Prussia; Ascherson and Graebner give it for Schleswig-Holstein, but it is not recorded in Prahl's Krit. Flora Sch.-Hol. 1890.

P. nodosus Poir. Herr Baagöe in his account of the Potamogetons gathered in Lieut. Olufsen's second Pamir expedition, 1898-9 (Vid. Medd. Nat. Foren. Kjobenhaven, 179 (1903)) used this name for *P. fluitans* Roth, "because it is not yet determined which shall bear Roth's name"—*i. e.* the Necker fruiting plant or the sterile hybrid. Poiret's *nodosus* (Encycl. Method. Supp. iv. 535 (1816) = *P. canariensis* Link, 1825) was founded on a plant collected by Broussonet in the Canaries.

P. americanus Cham. (*P. lonchites* Tuckerm.). To this are doubtless to be referred, as geographical varieties or subspecies, *P. occidentalis* Sieb., *P. Leschenaultii*, *P. O-Waihiensis*, *P. syriacus*, *P. mascarensis*, *P. marianensis*—all of Chamisso & Schlechtendahl in *Linnæa*, ii. (1827). The type-specimens of *P. occidentalis*, *P. Leschenaultii*, and *P. marianensis* in the Berlin Herbarium have fruits; the others are destitute of fruit; *P. O-Waihiensis* is in flower. There is a slight difference between the two first, hardly sufficient to constitute a subspecies; they seem to me to represent geographical varieties; *P. mascariensis* I think is a subspecies; the others are doubtful. It is curious that in the Mascarene Islands, which has (or had) such highly specialized birds, with fifty endemic genera of plants, all the Potamogetons save two are widely spread

species. *P. Chamissoi* Ar. Benn. is in habit, leaves, &c., quite unlike any other known species. Unfortunately I have as yet been unable to see any fruiting specimens, though I have specially sought for them. The other I have suggested may be referred to *P. sulcatus* Ar. Benn. of Australia, but of this I have only seen one sheet of specimens.

× P. SEMIFRUCTUS nov. hyb. (*P. obtusifolius* × *Friesii*?)

P. obtusifolius M. & K. "6, 8, 1886. Lake Glino, near Niedesh, leg. R. Caspary."

Pr. Posen, Prussia.

A good specimen, which I think may be named as above. It has the spikes, peduncles, and stipules of *Friesii*, but the two heads of fruits are more like *obtusifolius*; all the other spikes are interrupted (as in *Friesii*) and sterile; the flowers apparently never opened. On one spike only three fruits are perfect, all the rest are abortive. The leaves are mostly 3- but occasionally 5-veined, though the two outer ones are less distinct. The leaves of *obtusifolius* often curl in drying, or are puckered at the margins, but there is none of this in the specimen under notice; the width and apex of the leaves are too variable to give definite characters. Usually the leaves of *Friesii* are more strict than *obtusifolius*. It is not always easy to separate some forms of these two plants; that *Friesii* occasionally simulates the latter closely is shown by specimens I possess named "*P. mucronatus* Schrad. Sweden, 22, 8, 1882. C. O. Schlytar" from Dr. Tiselius; these are certainly *obtusifolius*, yet the apices of the leaves are much more like *Friesii* than *obtusifolius*. The specimen that most accords with this is a North American one, "*P. obtusifolius* M. & K. cum spica interrupta Hastings Co. T. Morong." This is undoubtedly *Friesii*. I wish German and American botanists interested in the genus would visit these localities and publish the result.

Of all the grass-leaved species *P. Friesii* has been most misnamed; I have seen it in various herbaria under the names *zosterifolius*, *acutifolius*, *Berchtoldii*, *pusillus*, *obtusifolius*, and *pectinatus*.

P. AMPLIFOLIUS Tuckerm. in Sill. Jour. 1st series, xlv. 38 (1843), and 2nd series, vi. 225 (1848). Specimens from Apponang Pond, Rhode Island, U.S.A., 26, 8, 80, collected by the late Dr. Morong, were named by him *amplifolius*; but in 1881 he sent other specimens, remarking: "Last year I sent you specimens from Apponang Pond, which were marked, 'form of *amplifolius*, with coriaceous lower leaves.' I now send others collected at the same spot this year, and undoubtedly the same species. I have satisfied myself that it is not *amplifolius*, but only a peculiar state of *P. pulcher*, produced perhaps by the condition of the water. None produced flower or fruit." So far as eye-judgment goes, I believe Dr. Morong's first naming was correct, for in none of the numerous specimens of *pulcher* I have seen are there any such leaves. Do both species grow in this pond? and, if so, is it a hybrid between the two?

I am aware I am treading on dangerous ground when I

suggest a misnomer by Dr. Morong of the species he knew so well; but careful comparison with a large series of both, from Ontario to Florida, and Massachusetts to California and Washington Territory seems to decide for *amplifolius*. The only specimen of *pulcher* that shows any shading off towards *amplifolius* is an autumnal shoot from "Pond in Hopkinton, Mass., Sept. 1877. T. Morong"; but these are undoubtedly *pulcher*, as named.

P. STRICTUS R. Philippi! Fl. Atacamensis, 50 (1860).

P. aulacophyllus K. Schum. in Fl. Bras. iii. 3, 696 (1894).

Dr. Graebner accepts my identification of Schumann's plant (see Journ. Bot. 1895, 374) with *P. strictus*. Its recorded stations are few. Desert of Atacama, N. Chili, Philippi! Cordillera de la Rioja, Argentina, Hieronymus and Niederlein, n. 226! Lac de Ramiajus, Nicaragua, Bolander! in Herb. Mus. Brit.

To me its nearest congener is *P. filiformis* Pers. var. *Macounii* Morong (under *marinus* L.) in Macoun Cat. Canad. pl. iv. 88 (1888), from Alberta, N.-W. Territory, which again seems near to some Central Asian forms.

P. JUNCIFOLIUS A. Kerner in Verh.-zool.-bot. Ges. Wien, xlv. 364 (1895), and Flor. Fl. Austr.-Hung. n. 2693.

"North Pond, East Point, Prince Edward's Island, Canada, 1888, No. 10, J. Macoun."

These specimens were named *P. flabellatus* Bab. by C. C. Babington, but the ripe fruit is much smaller, more resembling that of *P. filiformis* Pers. on a larger scale. This difference is well seen in specimens of *flabellatus* from "Maitland River at Goderich, S. W. Ontario, 1901, J. Macoun." Two other specimens of the *pectinatus* group (from Harrison's Ranch, N. Lower California, C. R. Orcutt ex Morong, and Valentine, Neb., 1891, J. M. Bates) have much smaller fruit than normal *pectinatus* or *flabellatus*, but are not *juncifolius*; they have much the appearance of slender states of *scoparius*, but in this the fruit is normal *flabellatus*. Probably these are only geographical forms of typical *pectinatus*. In Canada the plant may grow in brackish water, but Kerner's plant was distributed in the Austrian Tyrol; the much smaller fruit and style place it with *filiformis* Pers., *vaginatus* Turcz., *amblyophyllus* C. A. Meyer, and *strictus* Phil.; Baagöe places here his *P. pamiricus*, described in Vid. Medd. Nat. For. 1903, 182.

× P. CONCINNITUS nov. hybr. (*crispus* × *pusillus*?).

In looking over specimens of *crispus* from European countries, I found one labelled: "Growing with *pusillus* forma, 7, 6, 1882, Beéva bei Lásky, Moravia, leg. J. Bubela ex herb. Polák."

This is near the plant described as × *Bennettii* (*crispus* × *obtusifolius*?) by Mr. Fryer, but differs in the structure of the leaves and the apex of the leaves being more acute; the same minute glands occur at or near the base of the leaves. It is probably *crispus* × *pusillus*. It differs from *crispus* in the entire, more crisped or wavy margins of the leaves, with fewer cross-nerves; from *pusillus* in the leaves being shorter and broader, with the central nerve *crispus*-like in structure.

P. LUCENS L. subsp. BRASILIENSIS mihi.

P. lucens K. Schumann (non L.) in Fl. Bras. iii. 713, t. 119, fig. 2 (1894).

Province of Piauhy, N. E. Brazil, 1841, Gardner, n. 2756.

For some years I have hesitated as to the position of Gardner's specimens from Brazil, which Schumann referred to *lucens*. Further study, however, compels me to separate it from the type as a subspecies.

True *lucens* occurs in Chili ("Rio de S. José, leg. Krause, 1863," ex F. Philippi), and also in Cuba, Poeppig! St. Lucia, Guatemala, Bernoulli, n. 598! and Florida (Curtiss, n. 6692! and var. *floridanus* Ar. Benn.). *P. brasiliensis* differs from *lucens* in the narrower leaves, blackish-green in colour, with undulated margins, not denticulate as in *lucens*, they taper more sharply into a short petiole; the bluntly mucronate apex extends beyond the terminal nerves. The fruit is smaller, the central carina is decidedly winged, the lateral ones are less so; stipules less coriaceous, adpressed. In habit the plant is somewhat between *P. lucens* L. var. *azorica* Ar. Benn. and *P. maliana* Miq.

If the figures of *lucens* in *Linnæa*, ii. t. 5, fig. 16, Fieber Pot. Böh. t. 2, fig. 10, and Reichenbach, Ic. Fl. Germ. et Helv. vii. t. 36, fig. 64, are compared with that of Schumann, *l. c.*, the differences in the carina will at once be seen.

LA GASCA AND HIS 'HORTUS SICCUS LONDINENSIS.'

SOME years ago a collection of dried plants came into my possession, which, upon examination, proved to be three fasciculi of the above set. This Hortus Siccus is not referred to in the *Flora of Middlesex*, and no copy is, I believe, possessed by the National Herbarium at Cromwell Road. Since several of the plants are the first records for the county of Middlesex, it may be as well to give a complete list. The names employed by La Gasca are not always those now used, but there will be no difficulty in identifying what is intended. Place names in italics signify that the locality is not given in the *Flora of Middlesex*. It will be seen that the plants are correctly named in almost every case, but no rare species is included. The specimen of *Euphrasia stricta* is the earliest known to me.

From the *Biographical Index* we learn that La Gasca was born at Encinacorva, in Arragon, in 1776, and that he died at Barcelona in 1839. Cavanilles named a genus, *Lagasca*, in his honour. He published both the *Elenchus pl. in Hort. Matritensi* and *Genera et Species Pl.* in 1816; and took refuge in British territory in 1822. Trimen and Dyer stated he added *Polygonum mite* in 1826 to the British Flora, but it had been previously found; it is the *Persicaria angustifolia ex singulis geniculis florens* M. P., 90 Ray Syn. 145, 1726, and Dillenius has a specimen in his herbarium from Chelsea: see *Dillenian Herbaria*, p. 54.

The following is a copy of the titlepage of the first fascicle; the second and third, containing respectively twenty-five and thirty specimens, were issued in 1827; according to Colmeiro there was a fourth, which I have not seen:—

HORTUS SICCUS LONDINENSIS
or, a
Collection
of Dried Specimens of Plants
growing wild within twenty miles round London
named on the authority of the Banksian Herbarium
and other original Collections
By D. Mariano La-Gasca
Late professor and director of the Botanical Garden of Madrid,
Foreign member of the Horticultural Society of London,
and of many other scientific Academies in Europe.
London
Printed by M. Calero, 17 Frederick Place, Goswell Road
MDCCCXXVI

In the Preface the author says:—"The Hortus Siccus will be published in Parts, each containing 25 Plants. . . . With the name of the plant [taken from Smith's *English Flora*] will be given the place or places where it may have been found. . . . It is also proposed to state those places where the same plant is to be met with in Spain, of whose Flora very little is known; thus the Author, whilst satisfying the curiosity of the English Botanist, will, at the same time, be serving those of his own Country who very much desire correct information of the Plants of *Linnæus*. Although the Author has studied Botany with unremitted attention for more than 30 years, he does not altogether trust to his own knowledge, and the names of the Plants are given after having been compared with the Herbarium of the immortal Sir Joseph Banks (now in the possession of the celebrated R. Brown, Esq.), the plants of which have been compared with those of the original Herbarium of *Linnæus*, of *Aylmer Bourke Lambert* Esq. and those of the Messrs. *Sowerby*, who possess the original plants from which were executed the Engravings for the 'ENGLISH BOTANY.' These plants were described by the learned Sir *James Edward Smith*, Author of the 'ENGLISH FLORA,' and carefully compared with those of the Linnean Herbarium possessed by the same Author.

"The Author, assisted by his two eldest Sons, will every year be able to publish six Parts. It is intended to publish only 30 copies of this work by Subscription. . . . The amount of Subscription to be £1 each Part. Part 1st will be delivered on the 10th of Dec., and the second on the 31st of January. In future it is intended to publish one part every other month.

25 Camden Place, Camden Town. Mariano La-Gasca.
November 6, 1826."

Fasciculus Primus.

1. *Polygonum lapathifolium* L. a. *pallens*. Near *Camden Town* and Hampstead. Near Madrid and Arragon.

2. *Polygonum Hydropiper* L. Very common in watery places . . . on Hampstead Heath, *Camden Town*, and many other situations. In the Asturias and Santander in Spain.

3. *Solanum Dulcamara* L. Frequent near Hampstead, Kentish Town, Kew, Greenwich, and many other places. In moist situations in the vicinity of Madrid, and in all the provinces of Spain.

4. *Campanula rotundifolia* L. Abundant in barren places on Hampstead Heath, and in *Bishop's Wood*. On the Pyrenees, in Arvas, Busdongo, and other parts of the mountains of Leon.

5. *Tormentilla officinalis* Smith. Very abundant on Hampstead Heath, and in Bishop's Wood. From Campo Sagrado to Arvas in the mountains of Leon, in the Pyrenees, &c.

6. *Epilobium hirsutum* L. Frequent . . . Hampstead, Camden Town, *Chelsea*, and other places. Common on the banks of canals and drains near Madrid, Valencia, &c.

7. *Epilobium parviflorum* Schreb. Frequent . . . between Camden Town and Hampstead, on Hampstead Heath, and other places. In the province of Salamanca, Arragon, and on the mountains of Leon.

8. *Calluna vulgaris* Salisb. Abundant in dry situations on Hampstead Heath. On the mountains of Leon, the Asturias, and the rest of the northern provinces of Spain, in Arragon. A very remarkable variety grows in the south of Spain.

9. *Erica cinerea* L. Hampstead Heath. In the mountains of Galicia, Leon, the Asturias, Santander, and Biscay.

10. *Lathyrus pratensis* L. In the neighbourhood of *Hampstead*, and in other parts. In the vicinity of Leon.

11. *Matricaria Chamomilla* L. In the fields . . . Kentish Town, Hampstead, *Camden Town*, and other places.

12. *Apargia hispida* Willd. In the vicinity of Hampstead. On the mountains of Leon.

13. *Apargia autumnalis* Hoffm. Abundant . . . Hampstead, *Kentish Town*, &c. On Hampstead Heath a variety B is found, which is remarkable for having its leaves deeply pinnatifid. On the mountains of Leon.

14. *Achillea Millefolium* L. Common on Hampstead Heath; in the hedges a variety is found in great abundance of the height of one and two feet. Common on the mountains of Leon, &c.

15. *Atriplex angustifolia* Sm. Common . . . round *Camden Town*, Kentish Town, and other places in the vicinity of London. In moist situations near the Canal of Manzanares in Madrid, and especially near the Nursery grounds, close to the fifth Loch of the Canal.

16. *Rubus cæsius* L. Common . . . *Hampstead, Camden Town*, &c.

17. *Rubus corylifolius* Sm. Very common in the hedges at *Hampstead, Camden Town*, and other places.

18. *Cynosurus cristatus* L. Abundant . . . near Kew, *Chelsea*, *Hampstead*, &c. In all the provinces of Spain.

19. *Festuca loliacea* Curt. It grows in moist places near *Hampstead*, &c. I have also met with it in Spain.

20. *Glyceria aquatica* Sm. Banks of the Thames, and in all the watery ditches near Chelsea. At Borja in Arragon, and in other parts of Spain.

21. *Œnanthe Phellandrium* Spreng. In a pool near Kentish Town. In Arragon and Navarre.

22. *Torilis Anthriscus* Gmel. Frequent . . . near Highgate, Hampstead, *Kentish Town*, &c. In the vicinity of Madrid, in la Granja, and many other parts of Spain.

23. *Ranunculus Flammula* L. Common in bogs on Hampstead Heath and other places in the neighbourhood of London. On the mountains of Leon, in the Asturias, and the rest of the northern provinces of the Peninsula.

24. *Lycopus europæus* L. Near *Kentish Town*, Hampstead, &c. Common at Madrid, in Valencia, and other parts of Spain.

25. *Nephrodium Filix-mas*. In shady situations on *Hampstead Heath*. On the mountains of Leon, the Asturias, the Sierra de Segurra, and la Granja.

Fasciculus Secundus. MDCCCXXVII.

26. *Nephrodium dilatatum*. In moist and shady situations on Hampstead Heath. In la Granja, Galicia, and on the mountains of Leon, in Spain.

27. *Polypodium vulgare* L. Hampstead Heath. In almost all the mountains of Spain.

28. *Pteris aquilina* L. Hampstead Heath, Bishop's Wood, between Greenwich and Lewisham, and in many other places round London. Very common on the mountains of Spain.

29. *Pedicularis palustris* L. In the great vale of Hampstead Heath. On the mountains of Leon, Asturias, and the other northern provinces of Spain.

30. *Veronica Beccabunga* L. Near Hampstead, *Kentish Town*, *Pimlico*, and many other places in the neighbourhood of London. Very abundant round Madrid, Salamanca, in the Asturias, &c., in Spain.

31. *Ballota nigra* L. Near Highgate, Hampstead, Kew, and many other places. Frequent in Spain.

32. *Lamium album* L. Near Hampstead, *Kentish Town*, and other places in the neighbourhood of London. In the Asturias, and other northern provinces of Spain.

33. *Betonica officinalis* L. Hampstead Heath and Bishop's Wood. In elevated situations on the mountains of Leon, Arragon, &c.

34. *Chenopodium album* L. Near Camden Town and Pimlico. Very common in Spain.

35. *Atriplex erecta* L. Near Camden Town and Pimlico. [I should refer it to *A. deltoidea* Bab.]

36. *Epilobium palustre* L. In the great vale on Hampstead Heath. On the mountains of Leon near Arvas, and on Moncayo in Arragon.

37. *Capsella Bursa-pastoris* DC. Common in the neighbourhood of London. Also in Spain.

38. *Cerastium aquaticum* L. Near *Kentish Town* and *Pimlico*.

39. *Polygonum amphibium* L. Near *Camden Town*. Frequent in the northern provinces of Spain.

40. *Polygonum aviculare* L. Everywhere round London. Equally common in Spain.

41. *Rubus fruticosus* L. Very common near Hampstead and many places round London. Very frequent near Madrid and in many other parts of Spain [*R. rusticanus* Merc.].

42. *Holcus avenaceus* Smith. Common everywhere round London. Very frequent about Madrid, in Arragon, &c., in Spain.

43. *Aira cæspitosa* L. Near *Camden Town*, *Kentish Town*, and Hampstead. In the province of Cuenca, in Spain.

44. *Phleum pratense* L. Near Hampstead, *Kentish Town*, and in many other places. Near Leon, in Spain.

45. *Heracleum Sphondylium* L. Near Hampstead, *Kentish Town*, Bishop's Wood, *Chiswick*, &c. Near the Carthusian Monastery of Paular in Spain.

46. *Malva rotundifolia* L. Near Hampstead, *Camden Town*, and other places. Very common in Spain.

47. *Ranunculus acris* L. Very common everywhere round London. Very frequent in the vicinity of Leon and other parts of the northern provinces of Spain.

48. *Leontodon Taraxacum* L. Everywhere round London. Very common in Spain.

49. *Thrincia hirta* Roth. In pastures near Hampstead and on Hampstead Heath. Near Villacastin in Old Castille, and on the mountains of Herrera in Arragon.

50. *Anthemis nobilis* L. With *Thrincia hirta* on Hampstead Heath. Round Fuencarral, near Madrid; very abundant in the mountains of Arragon, Alcarria, &c.

Fasciculus Tertius. MDCCCXXVII.

The author announces "that in future he will publish a fasciculus every three months, and, therefore, the fourth fasciculus will appear on the first of July next. Each fasciculus will contain 30 plants, instead of 25."

51. *Anthemis arvensis* L. In cultivated fields near Kentish Town.

52. *Bidens tripartita* L. Near *Chelsea*, *Camden Town*, and on Hampstead Heath. In the northern provinces of Spain.

53. *Bidens cernua* L. Very abundant . . . on Hampstead Heath, *Pimlico*, and in many other places round London. On the mountains of Leon in Spain.

54. *Hypochæris radicata* L. Very common on *Hampstead Heath*, near *Kentish Town*, and in many other places near London. Very abundant near Madrid, and in all parts of Spain.

55. *Senecio vulgaris* L. Very common about London. Also in every part of Spain.

56. *Gnaphalium uliginosum* L. On Hampstead Heath. Near Pravia, in Asturias.

57. *Centaurea nigra* L. Very common near Hampstead and *Kentish Town*. Very frequent near Leon, in Galicia, Asturias, &c., in Spain.

58. *Asterocephalus Succisa* Lag. In grassy rather moist pastures. In the northern provinces of Spain.

59. *Bulbocastanum flexuosum* Lag. On Hampstead Heath, and near *Kentish Town*. On the Pyrenees, and on the mountains of the northern provinces of Spain.

60. *Myrrhis sylvestris* Lag. Very common near *Kentish Town*, Hampstead, *Chiswick*, Greenwich, &c. Near Leon in Spain.

61. *Chærophyllum Anthriscus* Lag. Between Greenwich and Lewisham very common. In moist shady situations near Madrid, and in all the provinces of Spain.

62. *Apium nodiflorum* Lag. On *Hampstead Heath*, near *Highgate*, and in many other places near London. Very common near Madrid, Valencia, &c., in Spain.

63. *Sison Amomum* L. On Hampstead Heath, between *Camden Town* and Hampstead, and in other places in the neighbourhood of London. In the northern provinces of Spain.

64. *Silaus pratensis* Besser. On *Hampstead Heath*. In the northern provinces of Spain.

65. *Æthusa Cynapium* L. A very common weed about *Chelsea*, Greenwich, Hampstead, &c., and in most parts about London. In Asturias, Santander, and Galicia, in Spain.

66. *Alopecurus pratensis* L. Everywhere about London. On the banks of Manzanares near Madrid, in meadows around Leon, Oviedo, &c., in Spain.

67. *Festuca duriuscula* L. On Hampstead Heath, and in other places about London. In the northern provinces of Spain.

68. *Glyceria fluitans* R. Br. Very frequent round London. Near Madrid, and in all the provinces of Spain.

69. *Hordeum pratense* Huds. In meadows and pastures, especially such as are rather moist, and in other places round London. Near Madrid *en la Real Casa del Campo*; near Valencia de Don Juan in Old Castille.

70. *Lolium perenne* L. Common in the vicinity of London. Near Madrid, and in all the provinces of Spain, very frequent.

71. *Poa annua* L. Everywhere about London. Also in Spain.

72. *Epilobium montanum* L. In dry, shady, or hilly places, and cottage roofs. In the mountains of Leon and Santander, in Spain.

73. *Epilobium tetragonum* L. Near *Camden Town*, on Hampstead Heath, and in many other places round London. Very frequent near Madrid, and in the northern provinces of Spain.

74. *Lamium purpureum* L. In all parts about London. Near Madrid, and in the northern provinces of Spain.

75. *Prunella vulgaris* L. Hampstead Heath, Bishop's Wood, and in many other places about London. Very frequent near Madrid, la Granja, and in almost all the provinces of Spain.

76. *Euphrasia officinalis* L. On Hampstead Heath. Near Leon, and in many other places in the northern provinces of Spain. [= *E. stricta* Host, the earliest British specimen known at present.]

77. *Polygonum Persicaria* L. Near Camden Town, Pimlico, and in many other places near London. Very common in Spain.

78. *Stellaria media* Sm. Everywhere about London. Very frequent in Spain.

79. *Chenopodium rubrum* L. Near Camden Town and Pimlico. Near Madrid in Spain.

80. *Senebiera Coronopus* DC. Near Hampstead, Camden Town, and other places about London. Very common in the vicinity of Madrid, and in all the provinces of Spain.

G. Claridge Druce.

It may be worth while to bring together the references to La Gasca's stay in England, and thus to supplement the brief notice which appeared in the *Biographical Index*: a full biography is published in Colmeiro's admirable *La Botánica y los Botánicos de la Peninsula Hispano-Lusitana*, pp. 191–5 (1850); according to this authority, he came to London in 1824 (not 1822).

The following is from La Gasca's translation in Hooker's *Botanical Miscellany* (i. 49–78) of the account by J. A. Schulthes of his visit to England in 1824, published in *Flora* for 1825, Beilage 1, Band 1, pp. 1–51:—

"Whilst we were employed in viewing Count Lambert's treasures, a little man dressed in black entered the apartment; and he cast a glance full of sorrow and indignation upon some packages which belonged to the herbarium of Ruiz and Pavon. This look attracted my attention, as did the general elevated physiognomy of this person. I could not suppress my curiosity, and asked Mr. Don who this little man might be. When he replied, *Senor Lagasca*! I threw myself into the arms of my old friend, who was much puzzled to imagine who I could be, for we had only known each other by correspondence, which had continued for some years; and here we met, as in a dream, where we least expected to see one another. Poor Lagasca! he had not only lost all his domestic happiness (his wife and five children being in Cadiz) and his fortune; but also his great herbarium; the manuscript of his Flora of Spain, on which he had been employed for more than twenty years, and which was ready to be printed; even the manuscript of his Monograph of the *Cerealia*, with the dried specimens belonging to it, on which he had laboured at Seville and there completed it—all, all were destroyed! He saved nothing from the great shipwreck of that Cortes, to which his talents and virtue had raised him, but his own life. Far from

his beautiful country, and from his beloved relations, he now lives in the foggy and expensive London, where he participates in the afflictions of so many of his worthy and exiled countrymen! Lagasca and I met almost daily after this interview, and made some botanical excursions together."

In 1831 the state of La Gasca's health compelled him to leave London for Jersey, where he remained until 1834; here he continued to add to the herbarium which he had formed in England to replace the one which had been destroyed in Spain during the counter-revolution of 1823. On his return to England he compiled a list of the plants he had noticed in Jersey, which was printed in the Report of the Jersey Agricultural and Horticultural Society for 1839. This, says Mr. Lester-Garland (*Fl. Jersey*, x.), "I have taken the trouble to exhume. . . . It is dated 'London, October 4, 1834,' and was sent by Dr. Lindley (who ought to have known better) to Colonel Le Couteur, the President of the Jersey Society. It need only be said that this list is so full of obvious absurdities that it is absolutely valueless. Native and cultivated plants, plants that do occur and plants that do not and never did, are all jumbled together in inextricable confusion. I have ignored it, and have not included his plants even in the List of Ambiguities and Errors."

We learn from the draft of a letter by Robert Brown to La Gasca, dated Aug. 2, 1834, and preserved in Brown's correspondence, that La Gasca had proposed to present his herbarium to the British Museum—a proposal which Brown encouraged; the transaction, however, was not completed. In 1851, according to a MS. note by Trimen in his copy of the *Flora of Middlesex*, on the authority of John Bull, it was "partly at Madrid and partly at Malaga, in a shocking condition."

The "first record" for *Polygonum mite* as a British plant may be carried back beyond 1724, assigned to it by Mr. Druce (Dillen. Herb. 54). A reference to the extract from *Museum Petiverianum* (the "M. P." of Ray's *Synopsis*), Cent. i. p. 13, no. 90 (1695), gives the locality quoted by Ray from Petiver:—"This I found the last Autumn on the Ditch-banks in the Meadows beyond the Lord Peterborough's House at Westminster." On the drawing for E. B. Supp., as quoted by Mr. Garry (*Notes on E. B. Drawings*, p. 161), J. De Carle Sowerby has noted: "P. Hydropiper variety without granules upon the calyx, thought to be a distinct species by Prof. La Gasca of Madrid, who gathered it in a ditch on the Road side at Chelsea, Octr. 1826." * The drawing seems to have been made from La Gasca's specimens, with corrections and root added from specimens sent by Babington.

JAMES BRITTEN.

* The note continues: "Considered by Mr. Sweet to be *P. minus*. *P. minus* of E. B. is Mr. Sweet's *P. repens*." This last name, which is not taken up in Ind. Kew. or elsewhere, will be found in *Sweet's Hortus Britannicus*, ed. 2, 439 (1830), without description, localized "Fulham."

SHORT NOTES.

The Scape of Taraxacum (p. 120).—If Mr. Beeby will refer to my *Flowers, Fruits and Leaves* (p. 52), he will find that I have described the curious movements of the flower-stalk of the Dandelion, and that they are even more remarkable than he supposes. My words are: "The flower-stalk stands more or less upright while the flower is expanded, a period which generally lasts for three or four days. It then lowers itself, and lies more or less horizontally and concealed during the time the seeds are maturing, which in our summer occupies about twelve days. It then again rises, and, becoming almost erect, facilitates the dispersion of the seeds, or, speaking botanically, the fruits, by the wind."—Avebury.

I have for several years utilized the peculiar movement of the scape described by Mr. Beeby, in my efforts to banish this weed from my lawn. Having tried various remedies, I came to the conclusion that gradually digging the plants out was the only effectual one, at the same time preventing survivors from seeding until their turn for drastic treatment arrived. Where the lawn-mower is used at intervals, the scapes become prostrate, and picking the flower-heads is difficult, as the flowers frequently open in one's absence and then close almost completely before fruiting, rendering them difficult to find. On making the discovery that they always became erect before fruiting, I ceased to waste time looking for the prostrate examples. There is always time to gather them after they have become erect, although this must be done daily in sunny weather in the early summer, and again in late autumn, when there is a second crop of blooms on a smaller scale. Although on the lawn the scapes are always prostrate, descendants of the same plants thrown over the fence and grown amongst longer grass have the scapes at all times erect.—J. A. Wheldon.

Sagina Reuteri Boiss.—The receipt of some Surrey specimens from Mr. Beeby, and a second reading of the excellent paper by Messrs. Ingham and Wheldon (pp. 109–111) led me to examine afresh my sheets of *S. apetala* and *S. ciliata*. *S. Reuteri* is treated as a native in the new edition of the *London Catalogue* and will probably prove to be by no means uncommon. Excepting the Hants plant, my specimens referred to below were all gathered for *S. apetala* var. *prostrata*, at a time when *S. Reuteri* had not been recorded for England. It appears to be new for the following vice-counties:—

3. S. Devon. Plentiful in sandy ground (a rabbit warren) at the top of the cliffs near Folly Farm, Bigbury, June 27th, 1894. A prostrate, crowded plant; analogous to *S. maritima* var. *densa*, but in all essentials resembling specimens from Great Malvern Station.

11. S. Hants. Reference number, 2289. Sandy fallow field between Bournemouth and Throop, in plenty, with *S. ciliata*, May 30th, 1899; Rev. E. F. Linton and I considered it at the time to be distinct from that and from *S. apetala*. Prostrate,

very glandular; of coarser growth than Malvern specimens, and with larger flowers, but I believe conspecific. The flowering sepals are purplish-edged, with a hyaline margin; and I find a tendency towards the same feature in the Malvern specimens, which were gathered on June 17th, and are thus considerably more advanced in growth.

15. E. KENT. Shingly beach near Littlestone-on-Sea, July 10th, 1893; field between Paddlesworth and Elham, July 14th, 1893. Just the Malvern plant.

17. SURREY. Eashing, near Godalming, 1884, *W. H. Beeby*, sp.; sandy ground near Tilford, June 21st, 1890. Intermediate between Malvern examples and Mr. Wheldon's from Birkenhead.—EDWARD S. MARSHALL.

ORTHOTRICHUM DIAPHANUM Schrad. VAR. AQUATICUM Davies.—In Mr. Nicholson's paper on the Mosses of Sussex (see p. 176) a plant growing on willows near Lewes is referred to this variety. I found the same form growing on trees below flood-mark by the River Lagan, at Magheralin, Co. Down, but did not know it had been described. Whether it be a variety or only a form, it is remarkable for the short hair-points and for the habitat. It was first described, I believe, in *Hedwigia*, 1873, p. 39, by Venturi as var. *aquatica* Davies.—C. H. WADDELL.

LOCALITIES FOR RUBI.—I send notes on some Brambles collected during the last few years which have been kindly examined for me by Rev. W. Moyle Rogers. New records for vice-counties are distinguished by an asterisk:—**Rubus incurvatus* Bab. Askeaton, Co. Limerick, Aug., 1905.—**R. sciaphilus* Lange. In a wood at Hanbury (or Dodder Hill) Common, Worcestershire, Aug. 11th, 1907. It has not been found previously in England so far east.—*R. leucostachys* Sm. Hampton Lovett, Worcestershire. —*R. Leyanus* Rogers. Saintfield, Co. Down. A very strongly armed form with veined armature. — **R. dasyphyllus* Rogers. Askeaton, Co. Limerick, July, 1905. New for this county.—*R. echinatus* Lindl. Hanbury Common, Worcester.—**R. velatus* Lefv. Sparingly in hedge north-west side of Ettington Park, Warwickshire, on the road betwen Newbold and Ettington station. — *R. dumetorum* Wh. & N. var. *diversifolius* (Lindl). Hampton Lovett, Worcestershire.—*R. corylifolius* Sm. var. *cyclophyllus* Lindeb. Hadzor, near Droitwich, Worcestershire; also a form intermediate between the vars. *sublustris* and *cyclophyllus*, Ettington Park, Warwickshire.—C. H. WADDELL.

SCOTTISH MOSSES.—I have gathered the following Mosses in Shetland, Orkney, Caithness and West Sutherland, which do not appear in the Moss Exchange Club Census Catalogue for the respective vice-counties, and may therefore, I presume, be regarded as new records for these vice-counties:—

FOR SHETLAND (V.-C. 112): *Polytrichum formosum* Hedw., *Dicranum elongatum* Schleich., *Campylopus flexuosus* Schleich. var. *uliginosus* Ren., *Grimmia trichophylla* Grev., *Pottia Heimii* Fürn., *Ulota phyllantha* var. *stricta* Nicholson, *Orthotrichum*

cupulatum Hoffm., *Mnium rostratum* Schrad., *Porotrichum alopecurum* Mitt., *Hypnum cupressiforme* var. *elatum* B. & S., *H. palustre* Huds.

For Orkney (v.-c. 111): *Dicranella squarrosa* Schimp., *Mnium serratum* Schrad., *Neckera complanata* Hübn., *Porotrichum alopecurum* Mitt., *Plagiothecium sylvaticum* var. *orthocladum* B. & S., *Hypnum molluscum* var. *condensatum* Schimp.

For Caithness (v.-c. 111): *Archidium alternifolium* Schimp., *Bryum intermedium* Brid., *Amblystegium irriguum* B. & S., *Hypnum polygamum* Schimp., *H. chrysophyllum* Brid.

For West Sutherland (v.-c. 108): *Dicranum scoparium* var. *spadiceum* Boul.—David Lillie.

Papaver somniferum.—In Journ. Bot. 1908, p. 126, the question is asked, "Is this anywhere more or less well-established?" I think it certainly is so in the neighbourhood of Headley and Mickleham, Surrey, where it occurred as long ago as about 1830, and exists there to the present day. There it grows in cornfields on a footing with the other Poppies, and in some years is so plentiful that it may be counted in hundreds.—C. E. Salmon.

"Barbula (aut Didymodon) Nicholsoni, spec. nov."—The following description of a new Moss, named as above, is contributed by Dr. P. Culmann to the *Revue Bryologique*, 1907, p. 103, where it is accompanied by figures:—"Planta dioica, flores feminei terminales, masculi fructusque deficientes. Habitus *Barbulæ rigidulæ* aut *spadiceæ*, cæspites fusco vel olivaceo virides, caulis, 1·0–2·5 cm. longus, versus apicem paraphysibus numerosis, simplicibus instructus, strictus, ramosus; fasciculus centralis distinctus, cellulæ corticales incrassatæ, mediæ collenchymatice textæ. Folia madefacta recurvantia demum erecta, fere incumbentia ex ovata basi lanceolata, acuta margine apice excepto revoluta; cellulæ marginis usque ad apicem bistratæ. Cellulæ, superiores foliorum vix incrassatæ, dense humiliter papillosæ, parvæ (lumen 0·006 mm.), rotundæ, inferiores bene quadratæ vel breviter rectangulæ, 0·008 ad 0·009 mm. latæ, æquilongæ versus infimam basin duplo aut triplo longiores, non vel leviter incrassatæ. Nervus crassus dorso prominens, apice cum foliis marginibus incrassatis confluens. Duces quatuor aut quinque, distincti, fasciculo stereïdarum uni vel bistrato suffulti. Wall of a culvert, Amberley Wild Brooks, Sussex, legit W. E. Nicholson."

Poa szechuensis, nom. nov.—I regret that in my monograph of the *Gramineæ* in Messrs. Forbes and Hemsley's *Enumeration of Chinese Plants* (Journ. Linn. Soc. xxxvi. 424 (1904)) I described a new species as *Poa gracillima*, overlooking *P. gracillima* Vasey in Contrib. U.S. Nat. Herb. i. 272 (1893). As Mr. A. S. Hitchcock, of the U.S. Department of Agriculture, informs me that the American *P. gracillima* is considered a good species, a new name must be assigned to the Chinese plant, which I therefore propose to call Poa szechuensis, from the name of the province in which it was found by Faber.—A. B. Rendle.

NOTICE OF BOOK.

Mathematische und mikroskopisch-anatomische studien über Blattstellungen. Von Dr. G. Van Iterson, Jun. Jena: Gustav Fischer. 1907. 8vo, pp. xii. 331, tt. xvi.

A careful study of Dr. Arthur Henry Church's treatise "On the Relation of *Phyllotaxis* to Mechanical Laws" seems to have led Dr. Iterson to reconsider and further to extend the geometrical and mechanical theories. The first and second parts of Church's treatise were noticed in this Journal for 1902, p. 201.

After the introduction, the first part of Iterson's book comprises the mathematical considerations, the first section of which treats of the simple systems of points on the surface of a circular cylinder; the second section deals with simple systems on a plane; the third with simple systems on the surface of a circular cone; and the fourth with compound systems of points. In the course of these investigations the mathematical formulæ and algebraical equations are numerous, and several of them are somewhat complicated, involving trigonometrical and logarithmic functions. Many arithmetical calculations arise in the application of these formulæ to particular cases, for the purpose of numerical illustrations, and twenty-one tables containing the results of such calculations are given. The author gratefully acknowledges the substantial assistance which he received from his sister Agatha in working out some of the more difficult of the calculations. The second part of the book contains the botanical applications.

It has been established by previous observers that the horizontal divergence between successive leaves on the stem of a plant, when the same is indicated as a fraction of the circumference of the axis, can be approximately represented, for the principal spiral, by a member of the following series:—

$\frac{1}{2}$, $\frac{1}{3}$, $\frac{2}{5}$, $\frac{3}{8}$, $\frac{5}{13}$, $\frac{8}{21}$, $\frac{13}{34}$, &c., the ultimate member of the series being $\frac{3-\sqrt{5}}{2} = \cdot 381966$ and called "the limiting divergence";

that is, when expressed in degrees, by one of the following angles:—

180°, 120°, 144°, 135°, 138° 28′, 137° 9′, 137° 39′, &c., to 137° 30′ 28″.

For the leaf-arrangement on a subordinate spiral the divergence can be approximately represented by a member of the following series:—

$$\frac{1}{z}, \frac{1}{z+1}, \frac{2}{2z+1}, \frac{3}{3z+2}, \frac{5}{5z+3}, \text{ &c., to } \frac{1}{z+\chi},$$

where z is an integer, and $\chi = \frac{\sqrt{5}-1}{2} = \cdot 618034$.

The divergences $\frac{1}{2}$ and $\frac{1}{3}$ are often pretty closely realized at the apex of vegetation; and the divergences $\frac{2}{5}$, $\frac{3}{8}$, and $\frac{5}{13}$ are sometimes tolerably well realized on the grown-up parts of plants; but perceptible deviations therefrom are generally found on the appendages, and there a greater approximation to "the limiting divergence" is reached.

Leaves often occur in whorls; and alternating whorls are comparatively common. The numbers of leaves in a whorl show great diversities, nevertheless the 2-, 3-, and 5-numbered alternating whorls are most frequent.

To illustrate the mechanical arrangement of crowded balls on an axis, Airy, in the *Proceedings of the Royal Society*, in 1873, narrated the following experiment:—Take a number of spheres (say oak-galls) to represent embryo-leaves, and attach them in two rows in alternate order ($\frac{1}{2}$) along opposide sides of a stretched india-rubber band. Give the band a slight twist to determine the direction of twist in the subsequent contraction, and then relax tension. The two rows of spheres will be seen to roll up with a strong twist into a tight complex order, which, if the spheres are attached in close contact with the axis, will be nearly the order $\frac{1}{3}$, with three steep spirals. If the spheres are set a little away from the axis the order becomes condensed into nearly $\frac{2}{5}$, with great precision and stability. It will also be seen that further contraction, with an increased distance from the axis, necessarily produces, at least approximately, the orders $\frac{3}{8}$, $\frac{5}{13}$, $\frac{8}{21}$, &c., in succession; and that these successive orders represent successive maxima of stability, in the process of change from the simple to the complex.

Again, in the *Proceedings* of the same Society of the following year, Airy showed, by other diagrams, that the same process of condensation, operating on the orders represented by the lower fractions of the series $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{7}$, $\frac{3}{11}$, &c., will produce the higher orders of that series. The same is shown for the series $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{9}$, &c. Dr. Iterson draws attention to these experiments.

Copious references are made to the works of previous writers on the subject, including German, Dutch, Russian, Hungarian, Italian, Swiss, French, and English authors.

W. P. Hiern.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on 19th March, Mr. Hemsley sent for exhibition a specimen of *Platanthera chlorantha* with three spurs, found by Miss Susan Allett, of Bath, and showing a spike each flower of which had the three petals spurred—a case of true peloria; the specimen shown last year, and figured in the Society's *Journal* (Botany, xxxviii, t. 1) had the three sepals spurred: a case of false peloria. Cav. Sommier has drawn attention to the occurrence of true and false peloria in *P. bifolia* in the neighbourhood of Florence. Mr. T. A. Sprague showed female

flowers and fruits of *Sterculia Alexandri* Harv., an extremely rare tree from Uitenhage, the only locality known for it, where it was first found in January, 1848, by Dr. R. C. Alexander (afterwards Prior). The specimens shown had been collected by Dr. S. Schönland, F.L.S., who reported that the seeds were of pleasant taste resembling a chestnut, and were greedily sought after and devoured by the baboons. Mr. C. H. Wright showed specimens of *Sphærothylax algiformis* Bisch., a rare South-African Podostemaceous plant, and spoke of the outward resemblances of some plants of this family to certain cryptogams, showing side by side examples of *Hydrostachys imbricata* A. Juss., and *H. nana* Engl., as resembling the alga *Caulerpa cupressoides*, and *Tristicha hypnoides* Spreng., with the form of a moss.

The last part (vol. xxiii. pt. 3) of the *Transactions of the Botanical Society of Edinburgh* contains an interesting article on Patrick Blair by Mr. Alexander P. Stevenson, which contains much useful biographical information. Prof. Balfour contributes a long memoir, with full bibliography, of H. Marshall Ward, and there are other biographical notices. Some readers may be puzzled to identify "Frank Townshend, a distinguished British botanist," who lived at "Wornington Hall"; Frederick Townsend, of Honington, is the botanist intended.

Mr. W. E. Nicholson sends us a reprint of what is evidently a careful and exhaustive paper on "The Mosses of Sussex," published in the *Hastings and East Sussex Naturalist*, vol i. no. 3 (Jan. 1908)—a periodical of which we now hear for the first time. While it is of course right and natural that local lists should be published in local journals, it is perhaps to be regretted that they should not be given such wider circulation among botanists as would be afforded by our own pages; every bibliographer knows the difficulty experienced in tracing information scattered through local and often ephemeral publications. The list contains 344 species, one of which has lately been described as new by Dr. Culmann, whose description we reprint on p. 173.

The Department of Botany has recently received a large and important collection of Angolan plants from Mr. John Gossweiler—his second contribution to a knowledge of the botany of this rich district of tropical West Africa. Mr. Gossweiler has collected in the Ganguellas and Ambuellas country, in the interior of south-east Angola, east of the Kunene River, and many of his specimens correspond with, or supplement, those obtained by the German collector H. Baum on the Kunene-Zambesi Expedition. Others are species hitherto known only from Welwitsch's collections; many of these supply a valuable series of specimens where hitherto we have had only uniques. The collection also includes a number of novelties which are in course of description.

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NOTES ON AFRICAN CONVOLVULACEÆ.—III.*

By A. B. Rendle, M.A., D.Sc.

The following notes have been made in the course of determining a considerable amount of new material of this order recently received at the British Museum from collectors in various parts of Tropical Africa. This includes Dr. A. G. Bagshawe's later collections in the Uganda Protectorate; an interesting collection from Gazaland, by Mr. C. F. M. Swynnerton; a further consignment from Rhodesia, from Mr. Fred Eyles; and an important collection from the interior of South-east Angola, by Mr. John Gossweiler. Besides containing new species the collections are of value in supplementing our knowledge of species previously described. Thus a variety of *Ipomœa commatophylla*, known previously only from a specimen collected by Speke and Grant in Unyoro, has been sent in some quantity by Dr. Bagshawe from the same locality, and Mr. Swynnerton sends from the Chirinda Mountains, in Gazaland, a *Cuscuta* (*C. kilimanjari*) hitherto known only from specimens sent by Sir Harry Johnson from Mount Kilimanjaro. Mr. Gossweiler has continued his excellent work in supplementing Welwitsch's great collections from Angola, both by discovery of new species and the enlargement of our knowledge of those collected by Dr. Welwitsch; his recent collection in the interior of South-east Angola, in the Ganguellas and Ambuellas country, deals with part of the district covered by the German Kunene-Zambesi expedition under Baum, and is proving to be of great interest, containing many of the plants collected by Baum, as well as a large proportion of new species.

Porana densiflora Hallier f. Of this species, which is known from several localities in British and German East Africa, the fruit has not hitherto been seen. Good specimens in both flower and fruit were sent by Dr. Bagshawe from Butiaba Plain, east coast of Lake Albert, at 2300 ft. altitude (Dec. 24th), no. 843. The following is a description of the fruit:—Capsula obtuse ovoidea atrate brunnea, valvis 4 longitudinaliter dehiscens, ·6 cm. longa, circa ·5 cm. lata; semen rotunde-ovoideum rugosum brunneo-viridescens, 3 mm. longum.

Seddera Bagshawei, sp. nov. Suffrutex virgatus multiceps e rhizomate duro lignoso crasso, caulibus rigidulis elongatis ascendentibus multiramosis tenuibus veluti foliis et facie dorsali sepalorum cum pilis appressis albis sparsius indutis; foliis subsessilibus lineari-lanceolatis integris apice breviter acutis; floribus numerosis in axillis ramulorum solitariis, breviter pedicellatis, iis *S. virgatæ* similibus; calyce campanulato, sepalis exterioribus ovatis vel obovatis, interioribus orbiculari-ovatis, coriaceis apice herbaceis; corolla alba calyce duplo longiore, in areis mesopetalinis albostrigosa; staminibus stylo stigmatibusque ut in *S. virgata*; capsula ovoideo-globosa, seminibus saturate rubro-brunneis, glabris.

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* See Journ. Bot. 1901, 12; 1902, 189.

Hab. Uganda Protectorate: in grass-land near mouth of River Mizizi, Lake Albert, 2500 ft., fl. and fr. Nov. 28th, *Bagshawe*, no. 1316; very common on the dry parched plain east of Lake Albert, 2300 ft., fl. and fr. Jan. 1st, *Bagshawe*, no. 1408.

The numerous repeatedly branching green stems 5–6 dm. long, 2 mm. or less in diameter, spring from a long tapering rootstock 3 cm. or more in thickness at the head; leaves 1–1·5 cm. long, 2–2·5 mm. broad; pedicels about 2 mm. long, bracteoles minute linear, springing from near the base of the pedicel; calyx about 3 mm. long, sepals closely imbricate, green with colourless margins; capsule ·5 cm. long, seed 2 mm. long.

Near *S. virgata* Hochst., which it resembles in habit, size of flower and fruit, and floral details, but is distinguished by its shorter and broader leaves, sparser indumentum, and more numerous axillary flowers.

Bonamia sedderoides, sp. nov. Suffrutex e rhizomate tenui elongato lignoso multiceps albido-sericeo-strigosus, caulibus prostratis patentibus ramosis, ramis in parte inferiore ramulos tenues plurimos, in parte superiore flores solitarios axillares gerentibus; foliis parvis lineari-lanceolatis acutiusculis subsessilibus; pedunculis tenuibus foliis subæqualibus, bracteolis foliaceis; sepalis coriaceis ovatis acutis; corolla ut apparet campanulato-infundibuliforme, quam calyce duplo vel plus duplo longiore, gilva, tubo purpureo-violaceo, externe areis commisuralibus exceptis hirsuta, areis mesopetalinis haud limitatis; staminibus inclusis subæqualibus, filamentis filiformibus basi pilosulis; ovario apice hirsuto, bilocellato, 4-ovulato; stylo altius bifido, ramis filiformibus paullo inæqualibus, stigmatibus peltatis.

Hab. South-east Angola: in shrub-grown pasturage on sandy alluvial soil at the foot of the Serra Ferreira de Amiral, western side, *Gossweiler*, no. 2888, Feb. 9th.

A spreading undershrub; rootstock scarcely exceeding ·5 cm. in diameter; stems generally branching, branches 4–6 dm. long, scarcely 2 mm. thick, branchlets slender, generally 5–11 cm. long; stem, leaves, and backs of sepals covered with somewhat silky whitish appressed hairs; leaves on the branches about 1·3 cm. long by 3 mm. broad, on the branchlets about 1 cm. by 2 mm. or less; bracteoles similar to but slightly smaller than the leaves, 7–8 mm. long, arising a little below the flower; sepals a little over 1 cm. long (usually 1·1–1·2 cm.), barely ·5 cm. broad; corolla beginning to wither, probably nearly 2·5 cm. long; stamens about 8 mm. long, anthers linear-oblong, 3 mm. long, style 1·3 mm. long, divided to within 2 mm. of the attachment.

A very well-marked species with the habit of a *Seddera*, and distinguished from all other species of its genus by its small narrow leaves, recalling those of *S. Bagshawei*.

Merremia quercifolia Hallier f. Has been hitherto known only from specimens collected by Welwitsch in Pungo Andongo, North Angola: these did not bear open flowers or fruits. Mr. Gossweiler sends two excellent specimens, with flower and fruit, from South-east Angola. No. 3888: "Rootstock perennial, many-

headed; stems prostrately spreading up to 15 ft. in length, reddish-green. In grass-grown open thickets of the 'Mumua' trees on red clayey soil along the River Cutato; the leaves are much liked by cattle." In fruit May 6th. The fruit is a deep red-brown capsule about 1·5 cm. in diameter, splitting lengthwise, and containing four large glabrescent brown seeds 7–8 mm. long.

No. 4267: "Stems several metres trailing on the ground; calyx dusky violet-purple; corolla lurid yellow outside, yellow inside, with brilliant violet-purple throat. Common in sunny situation at Umbanda Bissapa, Caconda," March 7th. The flowers are 3·5 cm. long and 3 cm. in diameter at the mouth.

Merremia stellata, sp. nov. Herba humilis stellato-pubescens, caule e rhizomate perenne, annuo erecto; foliis breviter petiolatis palmatisectis, segmentis lineari-lanceolatis; floribus solitariis longe pedicellatis; sepalis coriaceis ellipticis; corolla infundibuliforme, 2 cm. longa.

Hab. South-east Angola: in open woods at Kului, *Gossweiler*, no. 2906, February.

A unique specimen, with a slender stem 2 dm. long, densely pubescent, as are the short ascending branches, with stellate hairs which occur more sparsely on the backs, rarely on the upper face, of the leaves, and on the lower part of the calyx. Leaf-stalks ·5 cm. long or less, segments spreading, the middle one 3·5 cm. long by ·5 cm. broad, the laterals successively smaller, margin slightly wavy. Flowers axillary on slender pedicels, which reach 4 cm. long; bracteoles minute, lanceolate; sepals glabrous, except for the sparse stellate pubescence on the lower part, shortly acuminate, 13 mm. long, the two inner ones slightly shorter; corolla cream-white, glabrous, midpetaline areas not sharply limited; stamens about 1 cm. long, anthers twisted; pollen, style, and stigma of the genus.

A very distinct species, perhaps most nearly allied to two other Angolan species, *M. quercifolia* Hall. f. and *M. multisecta* Hall. f., which it resembles in the size of the flower, but distinguished from these by its habit and leaf-characters, and from all previously described species of the genus by the characteristic stellate pubescence, in which it recalls the genus *Astrochlæna*.

Ipomœa commatophylla A. Rich. var. angustifolia Oliver. Previously collected by Speke and Grant in Unyoro, Uganda, and now found by Dr. Bagshawe (no. 1566) at Foweira, Unyoro, at 3400 ft. elevation. The corolla is described as "light purple with rather darker centre." The seeds differ from those of the species in having a dense mottled brown-black pubescence, suggesting the coat of a tabby-cat—those of the species have a uniform brown pubescence—and resemble in this the somewhat smaller seeds of the closely-allied Australian species *I. heterophylla* Br.

I. asperifolia Hallier f., hitherto known only from the specimens collected by Welwitsch in Huilla (no. 6126) has been sent by Mr. Gossweiler from Cubango, where it grows plentifully in herb-grown thickets about the Fort Princeza Amelia

(nos. 2375, 4190). The corolla, which was originally described from imperfectly open or withering specimens, is well shown, and measures 1½ in., or nearly 4 cm. in length. *I. crassipes* var. *hirta* Hallier f., collected by Baum in the same district, is scarcely distinguishable.

Ipomœa gracilior, sp. nov. Herba scandens gracilis caule fulve piloso; foliis ovato-cordatis acuminatis apiculatis glabris vel præcipue dorso, sparse pilosis, siccis papyraceis, petiolis longis gracilibus; cymis dichasialibus laxiter plurifloris, pedunculis rigidulis folia sæpius excedentibus; bracteis parvis sepalis conformibus; pedicellis quam flores plus duplo minoribus, post florescentiam deflexis; floribus inter mediocres; sepalis subæqualibus, e basi latiore acuminatis, ciliatis; corolla infundibuliforme, 2·5–3·5 cm. longa, alba vel pallide violacea tubo purpureo; polline et stigmate generis; capsula globosa, læte brunnea, seminibus fuscis, scabridulis.

Hab. Uganda Protectorate: close to water, near Neusi River, Lake Albert, 3000 ft., fl. and fr. Dec. 20th, *Bagshawe*, no. 1385; in swamp, near Waki River, Unyoro, 3500 ft., fl. Jan. 16th, *Bagshawe*, no. 1435. Corolla very pale violet with purple centre. Gazaland: in swampy ground, Mount Maruma, 3500 ft., Portuguese East Africa, *Swynnerton*, no. 782, Sept. 13th. Flowers white, with a purple centre.

An elegant climber, height not recorded; the specimens include flower-bearing portions of shoots 80 cm. long and 2 mm. in diameter; the shoots, petioles, and inflorescence bear long yellowish hairs, which occur also on the edges and back of the sepals, and very sparsely on the leaves. Leaves 5–8 cm. long by 3–5 cm. broad; petioles 2·5–5 cm. long; peduncles to 9 cm. long, 1 mm. thick, 7-flowered or fewer; pedicels slender, 1–1·5 cm. long; bracts 3 mm. long or less; sepals 1 cm. long, the two outer tapering from an ovate base 2·5 mm. broad, the three inner less broad at base; midpetaline areas on corolla fairly well-marked, glabrescent; two stamens appreciably longer than the other three, about half the length of the corolla; capsule 5–6 mm. in diameter, seeds 3 mm. long, valves stoutly membranous.

A new species of the section *Calycanthemum*, perhaps most nearly allied to *I. tenuirostris* Choisy, but a more elegant, less densely hairy plant with laxer inflorescence, larger flowers, and pedicels sharply deflexed after flowering. The flowers resemble those of *I. mombassana* Vatke, in which, however, the outer sepals have a hastate base.

I. CRASSIPES Hook. var. CORDIFOLIA var. nov. Suffrutex multiceps canescens-hirsutus, ramis robustis et sublignescentibus vel elongatis et subherbaceis, prostratis vel procumbentibus; foliis parvis oblongo-ovatis cordatis vel subcordatis apice rotundatis, subsessilibus vel breviter petiolatis; floribus solitariis, pedunculis folia haud vel paullo excedentibus, bracteolis subfoliaceis ovatis, a calyce remotis; sepalis exterioribus ovatis subacuminatis basi vix cordatis, interioribus æquilongis vel paullo brevioribus valde angustioribus; corolla late campanulata.

Hab. Southern Rhodesia: Bulawayo, on schists, open veld, 4500 ft., *F. Eyles*, no. 21, Oct. Flowers purplish-red. South-east Angola: near Fort Princeza Amelia, Cubango; in poor gravelly short thicket-grown pasturage, *Gossweiler*, no. 2351, Dec.; flower delicate white with red-purplish colouration towards the base, expanding during the forenoon only; on poor pasturage in gravelly clay soils, no. 2503, Jan.; corolla pale red; in gravelly ground on sunny herb-grown pasturage, no. 2942, Jan.; flower rose-red.

Branches to 2½ ft. long (·8 metre); much shorter (to 20 cm.) and stouter in the Rhodesian specimen, which is also less densely hairy than the Angolan plants; leaves 2–2·5 cm. long, 1–1·5 cm. broad; petiole ·25–1 cm. long; peduncle 1·5–3·5 cm. long; bracteoles attached about the middle of the peduncle, about 1 cm. or a little longer; sepals about equal in length to the bracteoles; corolla 3·5–4 cm. long.

Near var. *ovata* Hallier f., but distinguished by its small cordate leaves, and is a more densely hairy plant.

I. LINOSEPALA Hallier f. Hitherto known only from Welwitsch's Angolan specimen (no. 6191), collected on rocks near Catele, Pungo Andongo. Mr. Gossweiler sends it from the interior of Southern Angola (no. 2299), where it is "common in short thicket-grown sandy clayey rocky inclined ground between Fort Princeza Amelia and River Cubango. The flowers (which in Welwitsch's specimen were all closed) are 3·5 cm. long, and paler than in Welwitsch's plant, having a white limb with the tube violet-red inside. The woody, cylindrical rhizome is 1 cm. thick.

I. WELWITSCHII Vatke. A very fine-flowered form was brought from Gazaland by Mr. C. F. M. Swynnerton (no. 301, near Chirinda, 3500 ft.), who describes it as a herb common on the Upper Umswirizwi; the flowers are 6 cm. long. There are also two interesting specimens from Mr. Gossweiler which enlarge our knowledge of the species. One (no. 3655) grows from a huge napiform rhizome, 1 dm. long and 4 cm. thick, and has a bright purplish-red corolla; it was found here and there in open thickets at Cubango near Fort Princeza Amelia (Jan. 1907), and is a narrow-leaved form of the var. *latifolia*, forming a link between that and the species.

Ipomœa Gossweileri, sp. nov. Herba glabra e tubere perennis, caulibus erectis vel decumbentibus, superne densius foliatis; foliis orbicularibus venulosis breviter petiolatis; floribus solitariis vel in cymis bifloris, pedicellis quam folia brevioribus; bracteis minutis; sepalis subæqualibus coriaceis ellipticis obtusis, inconspicue apiculatis; corolla ut apparet anguste infundibuliforme, purpurea, 4·5 cm. longa.

Hab. South-east Angola: here and there in short shrub-grown pasturage at River Cambambe (tributary of River Cuebe), Nov., *Gossweiler*, no. 3887.

A unique specimen, with slender soft woody stems, 20–30 cm.

long, springing from a short tuber, and bearing for 6–8 cm. from the apex 10 to 12 entire blunt leaves, about 2·5 cm. long and nearly as broad; leaf-stalk 3 mm. long; flowers axillary; peduncles 1 cm. long or less; bracteoles elliptical, apiculate, 2·3 mm. long; sepals glabrous, about 8 mm. long, the two inner slightly shorter; corolla (withered) about 4 cm. long.

An interesting species, nearly allied to *I. Welwitschii* Vatke, from which it is at once distinguished by the short roundish leaves; also by the elliptical blunt sepals.

Ipomœa Conceiroi, sp. nov. Suffrutex e rhizomate perenne multiceps, ramis "virgatis sarmentosis adscendentibus sæpe procumbentibus," cinereo-puberulis; foliis late cordatis subito et breviter acuminatis, densiter, præcipue in facie inferiore, fulvo-tomentosis, petiolis brevioribus apice glanduligeris; cymis trifloris, brevipedunculatis, bracteis subfoliaceis velut sepalis exterioribus dorso tomentosis; sepalis coriaceis ovalibus obtusis æquilongis accrescentibus; corolla late infundibuliforme, "externe pallide cærulea interne violaceo-purpurea"; capsula ovoidea glabra sordide brunnea; seminibus læte brunneis, pilis longis argenteo-sericeis indutis.

Hab. South-east Angola: rocky slopes of the Fort Conselheiro Borja, on the western bank of the River Cutchi, *Gossweiler*, no. 2443, in flower Dec. 24th; no. 3703, in fruit. A striking plant.

Branches in specimen reaching ·5 cm. diam. in fruit; leaves to 7 cm. long and as broad; peduncles about 1 cm. long; pedicels less than ·5 cm., increasing to 2 cm. and thickening upwards in the fruit; bracts about 1·7 cm. long, and nearly ·5 cm. broad above the middle, narrowing downwards; sepals about 1 cm. long to ·7 cm. broad; corolla 7 cm. long; capsule barely 2 cm. long; seeds ·7 cm. long.

A member of the section *Eriospermum* near *I. verbascoidea* Choisy, but distinguished by the exactly cordate leaves, the smaller flowers, ovoid capsules and the pure white silky covering of the seeds.

I have named this species in honour of Captain Henriques Paiva Conceiro, Governor-General of Angola, who has taken great interest in Mr. Gossweiler's botanical work.

Ipomœa Curtoi, sp. nov. Suffrutex alte et late scandens ramulis cinereo-pubescentibus, foliis flaccidis subcordatis tenuiter petiolatis, dorso sericeo-cinereo-pilosis, in facie superiore glabris; floribus inter mediocres numerosis in axillis folium superiorum velut umbellatis, bracteis parvis anguste ellipticis aggregatis, pedicellis tenuibus; sepalis ellipticis glabris subæqualibus albido-viridibus; corolla alba campanulata, 2 cm. longa; staminibus æqualibus, filamentis filiformibus e basi triangulare crassa pilosa, polline et stigmate generis.

Hab. Benguella: skirting the river-beds at Anha, March, *Gossweiler*, no. 4275.

Described as a soft woody climber, reaching 30 ft. high, with soft flaccid leaves. The flower-bearing shoots are woody and

nearly 4 mm. in diameter; leaves 5–7 cm. long and as broad, with a scarcely cordate base and blunt or obscurely apiculate apex; stalks shorter than the blade. The many-flowered umbellate cymes are borne in the axils of the leaves at the end of the shoot and its ultimate branchlets on stoutish pubescent peduncles, which are rather longer than the subtending leaf-stalk; bracts about 4 mm. long, densely hairy on the back; pedicels sparsely pubescent, longer than the calyx (to 1·5 cm. long); sepals about 1 cm. long, the two innermost slightly longer, ·5 cm. broad, apex rounded; corolla about 1·5 cm. broad at the distinctly 5-toothed mouth, midpetaline areas well-marked, hairy at the tips; stamens a little over 1 cm. long, the filaments forming a knee at the thick fleshy hairy bases which roof the space round the ovary; ovary glabrous, girt with a wavy cup-like disc less than 1 mm. high. Fruit not present.

Recalls in the shape of the leaf and the general form and details of the flower *I. shirensis* Oliv. from British Central Africa and Katanga (*Porana subrotundifolia* De Wild.), but differs in the strikingly umbellate inflorescence, in the character of the tomentum, and in the glabrous sepals; also in having white, not lilac, flowers. In the absence of fruit it is impossible to say whether the resemblance is maintained; *I. shirensis* is remarkable for its globose one-seeded fruit, supported by the accrescent, spreading, rigid sepals.

I have named this species in honour of Conselheiro Antonio Ramada Curto, the recent Governor of Angola, under whose auspices Mr. Gossweiler undertook his work of botanical exploration in the Ganguella and Ambuella country.

Argyreia Bagshawei, sp. nov. Suffrutex alte scandens, caulibus teretibus, siccis rugulosis, pubescentibus deinde glabrescentibus; foliis late ovato-cordatis, in facie superiore glabris, dorso albide-pubescentibus et punctato-glandulosis, petiolis puberulis laminas subæquantibus; floribus pluribus speciosis in pedunculis robustis brevibus aggregatis, bracteis caducis, pedicellis brevibus; sepalis arcte imbricatis, orbicularibus ad late ovalibus, obtusis, dorso puberulis, margine submembranaceis; corolla late-infundibuliforme, saturate rosea, areis mesopetalis bene limitatis apice pubescentibus; staminibus æquilongis in extremo basi densiter pilosis; fructu ignota.

Hab. Uganda: Unyoro, near Masinde, 3000 ft., Jan. 12th, *Bagshawe*, no. 869; twiner, with handsome maroon flowers; Toro, forest near mouth of Mpanga River, 3500 ft., Aug., *Bagshawe*, no. 1180; a high climber, flowers red.

A handsome climber. Stems ·4 cm. in diameter; leaves 11–13 cm. long and about as broad; petioles subequal or slightly shorter; the back of the leaf bears the small punctiform glands characteristic of *A. multiflora* and other species, which were accordingly separated by Hallier as a distinct genus, *Stictiocardia*; peduncles nearly 2 cm. long or less, nearly as stout as the stem, bearing a short-branched many-flowered cyme; flower-buds and flowers falling in drying; pedicels less than 1 cm. long; sepals

about ·8 cm. long, the outer broader and slightly shorter; corolla 5·5 cm. long; stamens 4 cm. including the anthers (barely ·5 cm.).

The general resemblance to other species of *Argyreia*, such as the widespread *A. tiliæfolia*, leads me to place this in the genus, in spite of absence of fruit. It is apparently near the Mozambique species *A. multiflora* Baker, which I have not seen, but the latter has a white corolla of oblong-elliptic, sometimes mucronate sepals.

Cuscuta kilimanjari Oliver. Hitherto known only from the specimens collected by Johnston on Mount Kilimanjaro, at 6000 ft. elevation, this has been found by Mr. Swynnerton in Gazaland on the outskirts of Chirinda, at 3800 ft., no. 453, May 20th. The stems, calyces, &c., are described as pink, and the flowers as pinkish-white; the corolla in the original specimen from Kilimanjaro is described as yellowish-white, but I can find no other differences between this and the Gazaland plants. The latter are parasitic on *Mellera lobulata* S. Moore, a species from Uganda and Nyasaland which Mr. Swynnerton has now collected in Gazaland; the host of the Kilimanjaro specimens is another acanthaceous plant of very similar habit, *Justicia flava* Vahl.

Other species worthy of record are:—*Calonyction speciosum* Choisy, from the Semliki Forest, Toro, and from near Hoima, Unyoro; of the latter specimen Dr. Bagshawe notes that the flowers remain expanded till 9 a.m.; though plentiful in West Tropical Africa, this has hitherto only been recorded from one locality, Gallabat (*Schweinfurth*), for eastern Africa—the West African oil palm, *Elæis guineensis*, also reaches the Semliki Forest; *Jacquemontia ovalifolia* Hallier f., from the shore of Lake Albert, near Kibero, with runners attaining 10 ft. in length (*Bagshawe*, 1422); *Merremia pterygocaulos* Hallier f., from east shore of Lake Albert, near Neusi River (*Bagshawe*, 1335); *M. angustifolia*, from shore of same lake near Waki River (*Bagshawe*, 1428); the South Tropical African *Ipomœa Bolusiana* Schinz, from Girandongombe, between the Luassingua and Longa Rivers, Ganguellaland (*Gossweiler*, unique specimen); and *I. blepharophylla* Hallier f., from Lake Albert, near Neusi River, *Bagshawe*, no. 1347, and Unyoro, no. 1593.

MOSSES FROM THE CANARY ISLANDS.

By H. N. Dixon, M.A., F.L.S.

A small collection of Mosses, made by Miss Wells not long since, has been sent to me, and as it contains several additions to the bryological flora of these islands, as well as one or two plants of special interest, its contents appear worth putting on record.

Three specimens were gathered on Teneriffe, viz., *Bartramia stricta* Brid., *Hypnum cupressiforme* L., and *Grimmia azorica* Ren. & Card. The latter was not quite so well marked in its dif-

ferences from *G. trichophylla* as another specimen collected on Palma, but clearly was referable to *G. azorica*. It contained a single withered capsule, not distinguishable from *G. trichophylla* in a similar condition.

The remaining gatherings were made on Palma, at an altitude between 3000 and 6000 ft. They included about twenty species, several of them represented by only a few stems. It is rather remarkable that in so small a collection so large a number, comparatively speaking, should be new to the Canaries, and in some cases to the Atlantic Islands as a group; and it would seem to indicate that a thorough investigation of the bryology of these islands would be repaid still further. In the following list those species new to the Canaries are indicated by an asterisk (*); those new to the Atlantic Islands as a whole by a dagger (†). As data for these conclusions I have used as a basis the list given of the Mosses of the Atlantic Islands by Renauld and Cardot (*Bull. Herb. Boissier*, 1902, tome ii, p. 448), supplemented by the following publications, which are all, so far as I have any knowledge, issued since the compilation of that list:—

Cardot, J. "Nouvelle Contribution à la Flore Bryologique des Iles Atlantiques," *Bull. Herb. Boissier*, 1905, tome v, p. 201. (It may be worth noting that the date on the wrapper of the *tirage à part* is given by error as *année* 1904, *tome* iv).

Luisier, A. "Mosses of Madeira," *Bull. Soc. Portugaise de Sci. Nat. Lisbonne*, i. (1907), p. 71.

Pitard, Corbière & Négri. "Contribution à l'Etude des Muscinées des Iles Canaries," *Bull. Soc. Bot. de France*, Mémoires, No. 7, 1907.

Polytrichum piliferum Schreb. st. Two fragments.

**Grimmia azorica* Ren. & Card. st. A small tuft. Well-marked in its distinguishing characters from *G. trichophylla*. The hair-points in this specimen are short, and, indeed, usually wanting.

†*Encalypta streptocarpa* Hedw. st. A few short stems only.

Mnium rostratum Schrad. st.

Anacolia Webbii Schimp. st.

**Fontinalis antipyretica* var. *azorica* Card. st. Quite different in habit from the type, and referable, I have no doubt, to Cardot's variety, with the description of which it very well agrees.

Neckera complanata Hüb. cfr.—*N. crispa* Hedw. st. This is quite certainly Hedwig's plant, and not the *N. intermedia* Brid., which would appear to be far the more frequent plant in the Canaries. I should feel no doubt, after examining the specimens in the British Museum Herbarium (and I find the conclusion supported by Pitard, Corbière and Négri, in the paper quoted above), that *N. lævifolia* (Schiffn.) Card. (= *N. intermedia* var. *lævigata* Schp.) is a simple variety of *N. intermedia*. It is a precisely parallel form to the var. *falcata* Boul. of *N. crispa*, and as occurs not uncommonly with the latter plant, a branch may here and there be found on typical *N. intermedia* bearing all the

characters of the variety. It is, I believe, in the case of *N. crispa* var. *falcata* at least, a response to xerophytic conditions.

Porotrichum alopecurum Mitt. st. The ordinary form.

†*Anomodon viticulosus* Hook. & Tayl. ♂. A rather fragile-leaved, dull-green form, but in all respects agreeing with the European plant.

†*Isothecium myurum* Brid. st. Our ordinary, smaller form.

Homalothecium sericeum B. & S. cfr. The type, I think, not var. *Mandoni* (Mitt.), which I have not seen.

Brachythecium rutabulum B. & S. st. Pitard, &c. (*op. cit.*), gives this from several localities in the Canaries, not recording it as new to these islands, but it is not included in the list given by Renauld and Cardot.—? *B. salebrosum* B. & S. A rather robust plant, with the leaves often sharply toothed, rigid and plicate, may belong here, or possibly to *B. rutabulum* var. *robustum* B. & S. It is, however, sterile and fragmentary.—*B. purum* (L.) Dixon, st.

BRACHYTHECIUM PURUM var. CANARIENSE mihi, var. nov. A forma typica differt; folia caulina parum concava, oblongo-triangularia vel deltoidea, multo-plicata; folia ramorum vix concava, nunquam cochleariformia, oblongo-triangularia, acuta vel breviter nec subito apiculata, pluries profunde plicata, rigida. Areolatio basin versus parum laxior cellulæ, ad infimam basin 1–2 seriebus subito latiores quadratæ vel rectangulares.

Palma, alt. 3000–6000 ft.

This very remarkable variety has, beyond the general habit, none of the aspect of *B. purum*, owing to the closely imbricated, rigid, scarcely concave leaves, deeply and regularly longitudinally plicate. The appearance under the lens is much more, in fact, that of some forms of *Trachypus auriculatus* Mitt. than of typical *B. purum*. Indeed, I should have had considerable hesitation in referring it to this species had it not been for the fact that a branch here and there exhibited leaves approaching the normal form of *B. purum*, while, on the other hand, specimens of *B. purum* type showed occasionally a branch bearing leaves distinctly tending towards the characters of the variety.

The few stems received were of a bright golden yellow, with densely pinnate ramification. The areolation, becoming throughout the mid-base rapidly narrowed and linear rhomboid, instead of, as usual, somewhat lax and hexagonal, and gradually passing from the rectangular cells at the line of insertion to the narrow cells of the mid-leaf, appears to furnish another character of varietal value.

Eurhynchium Stokesii var. *Teneriffæ* Ren. & Card. st.

†*Amblystegium serpens* B. & S. cfr. I can find no difference from our ordinary European plant, except that the colour is slightly more reddish than usual. It is certainly not *A. maderense* (Mitt.).

Hypnum riparium B. & S. st.—**H. cupressiforme* var. *resupinatum* Schp. cfr.—†*H. molluscum* Hedw. st. Our commonest European form; a few stems only.—**H. cuspidatum* L. st. Apparently a somewhat aquatic state, with *H. riparium*.

NOTES ON THE FLORA OF FLINTSHIRE.

By A. A. Dallman, F.C.S.

The following paper is supplementary to that published in this Journal for 1907 (pp. 138–153), and is arranged on the same lines. New county records and plants not recorded for the county in *Topographical Botany* are indicated by an asterisk; the entries in Top. Bot. on the authority of J. F. Robinson are ignored for reasons stated in my previous paper. I have to thank Mrs. Macdonald (Cwm), Mrs. New (Mollington), Miss Albinia and Miss B. Payne, of Chester, the Revs. W. Wright Mason, B.A., M. Toohey, S.J., and P. Stapleton, S.J., and Messrs. Sydney G. Cummings, R. H. Day, W. Chesher, M.A., F. J. Routledge, C. E. Salmon, W. G. Travis, Harold J. Wheldon, and William Whitwell, F.L.S., for valuable contributions. I am also further indebted to Miss H. Roberts, Mr. Arthur Bennett, Dr. H. Franklin Parsons, and Mr. J. Hutt, M.A., of the Liverpool Lyceum Library; and last, but by no means least, to Mr. J. A. Wheldon, F.L.S., who accompanied me on several excursions, and has given much kind help.

The Rev. P. Stapleton called my attention to the existence of several books of manuscript notes on the flora of Flint and Denbigh, preserved at St. Beuno's College, near St. Asaph. By the courtesy of the Rector of St. Beuno's, and with Mr. Stapleton's assistance, I have been able to examine these notes and also the College herbarium. The records extend over a period of some twenty-four years, beginning in 1884 with a note-book entitled "The St. Beuno's Flora." This very useful list appears to have been compiled by the late Rev. John Robertson, S.J. (St. Beuno's, 1884–87). Another manuscript work, entitled "Plant Rambles in the Vale of Clwyd," by the same writer, has also proved of service. A second important manuscript flora was written by the Rev. Henry Horn, S.J. (St. Beuno's, 1899–1902), now of Wimbledon College. These works contain additions inserted by other observers at various times. Records quoted from any of these manuscripts are hereafter indicated by the collective abbreviation *Fl. B.*—Flora of St. Beuno's. This also includes a list and number of records left by Father B. Huson, S.J. (St. Beuno's, 1889–1891), now of Blackpool. The Herbarium (*Herb. B.*) appears to be mainly the work of the late Rev. Sylvester Hunter, S.J. (St. Beuno's, 1885–1891), and contains voucher specimens of some of the species recorded in Father Robertson's list.

While going through the botanical bibliography of the county, I came across a number of interesting records, including several plants which are not given for v.-c. 51 in *Topographical Botany*. This, coupled with the fact that in some cases the source of such information might easily be overlooked, has caused me to include several such records in the present list. These are mainly culled from the following sources: *British Association Handbook to Liverpool*, 1896; Bingley's *North Wales*, 1804; and Pennant's

History of the Parishes of Whiteford and Holywell, 1796. The last-named, which includes several Flintshire plant records, appears to have been previously overlooked, as it is not mentioned in Dr. Trimen's article on "The Botanical Bibliography of the British Counties" (*Journ. Bot.* 1874). *Philosophical Transactions*, vol. lxi. (1772), contains (pp. 359–389) "A Letter from Richard Waring, Esq., F.R.S., to the Hon. Daines Barrington, on some plants found in several parts of England." Waring resided at Leeswood, in Flint, whence his letter is dated, and his communication mentions a number of Flintshire plants.

The initials W. & D. (Wheldon and Dallman) indicate that the record rests on our joint authority; where no authority follows I alone am responsible.

Clematis Vitalba L. Near the limestone quarry on Din Colyn Hill, Allt Craig, Dyserth, *Mrs. Macdonald*; near St. Beuno's College, 1881, *Toohey*; on bushes by the roadside adjoining Mostyn police-station, and extending along the neighbouring railway-embankment.

**Adonis annua* L. Casual in St. Beuno's College gardens amongst potatoes, 1882, *Toohey*.

Ranunculus Lenormandi F. Schultz. Road right at end of "Blackberry Lane" (*i. e.* near Aelwyd-uchaf), and in lane leading to Caerwys, *Fl. B.*; damp ground to south of Moel Arthur.—*R. heterophyllus* Weber. Pond to west of St. Beuno's, May 14th, 1885, *Herb. B.*; Plash, near Point of Air, *W. & D.*—**R. hederaceus* L. In the wet nant below the School House, *Fl. B.*; near Cwm, *Macdonald*, sp. — **R. Lingua* L. Marsh above Ffynnon Beuno (near Tremeirchion), and in one of the ponds in field north of Mrs. Lewis's house (*i. e.* Plas-yn-Cwm below Cwm), *Fl. B.* Although this species is unrecorded for v.-c. 51 in *Top. Bot.*, there is an old Flint record in the *Botanist's Guide*, "Great Pool at Upper Leeswood, near Mold (*Griffith*)."

Aquilegia vulgaris L. Caerwys Wood, and the hill beyond Bodfari Mine, *Fl. B.*; very plentiful on the hedge-bank about half a mile from Tai Marian, on the Ochr-y-Foel Road, leading to the Dyserth Motor Station, *Macdonald*, sp.

Glaucium flavum Crantz. On the Flintshire coast, *Macdonald*. I refrain from giving the locality.

Corydalis claviculata DC. St. Beuno's, among furze on left-hand as you approach the top of "Blackberry Lane," *Herb. B.*; still there in quantity, 1908, *Stapleton*, sp.—*C. lutea* DC. Talacre, May 25th, 1885, *Herb. B.*

Fumaria capreolata L. Wall before Tremeirchion Hill, *Fl. B.* —**F. officinalis* L. Roadside near Nerquis Hall, at about 550 ft., 1907.

Cheiranthus Cheiri L. Limestone rocks, Ochr Foel, Dyserth. *Macdonald*; on limestone scar, Bryniau, Meliden.

Radicula palustris Moench. "Father Huson says it grows on the left bank of Clwyd above Llannerch Bridge," *Fl. B.*

**Barbarea vulgaris* R. Br.). Field near Brewer's Hall below

Chester, *Payne*; Dyserth, *Fl. B.*; Rhydymwyn, 1905.—*B. verna* Asch. (*præcox* Br.). In the valley below St. Beuno's, *Fl. B.*

**Hesperis matronalis* L. Near Mold, *Payne.*

**Sisymbrium Thalianum* J. Gay. Road to Dyserth, from St. Beuno's, *Fl. B.*; laneside east of Moel Plâs Yw, alt. circa 700 ft., May, 1907.—*S. Sophia* L. Sea-land meadows, *Payne*; near sand-hills near Prestatyn, *Fl. B.*

**Brassica campestris* L. Cwm, *Macdonald*, sp.; Rhydymwyn, *Payne*; Hawarden.

Diplotaxis muralis DC. Once found on rubbish-heap near Rhyddlan, *Fl. B.*—**β Babingtonii* Syme. Weed in St. Beuno's garden, 1903, *Fl. B.*

**Alyssum maritimum* L. Cwm, *Macdonald*, sp.

Cochlearia officinalis L. On right bank of Clwyd between Rhuddlan and Rhyl, *Fl. B.*

Lepidium Draba L. Railway-embankment, Dyserth and Talargoch, *Fl. & Herb. B.*; Brewer's Hall Meadows, *Payne.*—*L. campestre* Br. Fields in valley in front of, and to right of, St. Beuno's, *Fl. B.*—*L. heterophyllum* Benth. (*Smithii* Hook.). Roadside near St. Beuno's, *Fl. B.*—**L. ruderale* L. Several plants by the old cement works, Prestatyn, 1907.

Coronopus procumbens Gilib. Against wall to left beyond Dyserth Church, *Fl. B.*; near the Colliery at Point of Air, *W. & D.*

**Teesdalia nudicaulis* R. Br. Hill at back of Bodfari Mine to south, *Fl. B.*

Reseda Luteola L. Plentiful in Tremeirchion Quarry, *Fl. B.* still there, 1907, *Stapleton*; Meliden, *Travis*; Point of Air.

Helianthemum canum Daumg. Carpeting the slope of the hill known as Allt, above Meliden, *Macdonald*, sp.; near the aqueduct west of Castle Hill, Dyserth, and other spots near Dyserth; the Gop and Moel Hiraddog, *Fl. B.*

Viola odorata* L. Bumper's Lane, Sealands, *Payne*; on road to St. Asaph (from Rhuallt) shortly before Clwyd Bridge, *Fl. B.*; in a hedgerow on pathside, one field before coming to Dennet's Farm (*i. e.* Hafod-y-coed, below Brynbella, Tremeirchion), *Fl. B.*; on the south side of the road about one and a half miles north-west of Mold, near Rhual, at about 420 ft., *A. A. D.*; (Pen-y-bryn Wood, but it is doubtful if it is truly wild here, as there was once a cottage on the spot), *Fl. B.*—*f. *alba* Lange. Between Cwm and Dyserth, *Fl. B.*—*V. hirta* L. Chapel Rock, St. Beuno's, *Fl. B.*—V. canina* L. Sandy ground at Point of Air, September, 1907, *W. & D.*—**V. arvensis* Murr. Rhydymwyn, 1903, *Mason*; Hawarden; fields below St. Beuno's College.—*V. lutea* Huds. "Roadside between Holywell and St. Asaph, Mr. H. Christy," With. (*Arr.* ed. 7, ii. 332); in some quantity about Talargoch, Rhosesmor, and Trelogan, with occasional specimens of the variety **amæna* (Symons), *Brit. Assn. Handb.*

**Dianthus Armeria* L. A station for this interesting addition to the Flintshire flora is mentioned by Father Horn in *Fl. B.* This is within five miles of St. Asaph, but I refrain from publishing the locality; a good quantity was found in flower on

July 29th, 1903, by Mr. S. G. Cummings. This plant would seem to be extinct in all its old Welsh stations—see *Journ. Bot.* 1908, p. 84—and it does not appear to have been seen in the Principality for many years. Consequently this Flintshire station is probably the only locality in Wales where *Dianthus Armeria* occurs at the present day.

Saponaria officinalis L. Rhuallt, *Fl. B.*

Silene amœna* Huds. "Father Huson says he found it above the shore near Rhyl," *Fl. B.* — **S. anglica* L. Road to Bodfari (from St. Beuno's), *Fl. B.* — **S. noctiflora* L. At foot of hill below Bodfari Mine to the east, *Fl. B.*—*S. latifolia* Britt. & Rend. (*S. Cucubalus* Wibel). Sealand Meadows, *Payne*; near Mostyn.—β puberula* Syme. In quarry opposite Caerwys Station, and also on way to Llyn Helyg, in first field after leaving muddy cart-road, *Fl. B.*

Lychnis Githago Scop. Two plants by the old cement works, Prestatyn, 1907.

Sagina procumbens L. Point of Air. — *S. maritima* G. Don. Dee shore about Queensferry.

**Honkenya peploides* Ehrh. Mostyn, 1898, *Mason.*

Arenaria serpyllifolia L. On the stony bank at Tremeirchion, *Fl. B.*; near Mold.

Stellaria uliginosa* Murr. Mostyn, 1898, *Mason.*—S. nemorum* L. "In a hedge close to the river, about one hundred yards above the ford at Rhyd-y-Ddae Dwfr, betwixt St. Asaph and Rhyddlan, and on the Rhyddlan side of the river," *Bingley.*

**Moenchia erecta* Gaertn. Hills beyond Tremeirchion, *Fl. B.*

Alsine marginata L. H. G. Reichenb. (*Spergularia media* Pers.). Dee shore, Queensferry, Point of Air, &c.

**Claytonia sibirica* L. Several plants as a weed in Hawarden Churchyard, June, 1907.

Malva rotundifolia L. Mostyn, 1898, *Mason*; on the bank, Tremeirchion, *Fl. B.* — *M. moschata* L. Golf-links, St. Beuno's, *Stapleton.*

**Hypericum calycinum* L. Occurs in quantity in a shrubbery near Mostyn Hall, but originally planted. — *H. quadrangulum* L. Bumper's Lane, *Payne.*—*H. perforatum* L. Railway-embankment, Mostyn; Mostyn Park. — *H. pulchrum* L. Near Mold, *Payne*; Rhydymwyn, 1903, *Mason*; near Meliden, *Travis.*

Geranium pyrenaicum* Burm. fil. Nerquis, *Mrs. Vale* (*Mason*); in a meadow on the left just after passing Bodfari Mine, *Fl. B.*—G. rotundifolium* L. "In a large dry barren field, S.S.E. of and near the Voel" (*i. e.* Moel Hiraddug), *Fl. B.*—*G. pusillum* L. In last field on field route to Pont-y-Cambwll, *Fl. B.*—*G. columbinum* L. Hill beyond Rhialt (Rhuallt); common on the Bodfari Road, *Fl. B.*

**Erodium moschatum* L'Hérit. Near Rhyl, *Herb. B.*—*E. maritimum* L'Hérit. In quantity on a flat sandy expanse immediately behind the sandhills at the Point of Air, September, 1907, *W. & D.* The plant was gregarious here, and grew in a very arid and exposed situation among bare sand with no other vegetation save a

few plants of *Salsola*. We were much struck by an interesting and apparently hitherto unnoticed feature in connection with the ecology of this species. The leaves of the growing plant are tightly pressed against the surface of the sand, giving the rosette a characteristic flattened aspect. On uprooting the plant, the leaves are instantly and violently dejected, each leaf acting as a spring and pressing down with considerable force. This strong reflex elasticity of the petioles, by keeping the stomata on the under surface of the leaf in close contact with the ground, is of value to the plant in retarding transpiration, and hence is to be regarded as a xerophytic adaptation. There is a curious gap in the range of this species on the north-west coast. Although it is found in all the Welsh littoral counties and in Cumberland and Westmorland, it does not seem to occur in Lancashire or Cheshire. Its absence is surprising, as one would expect the sand dunes along the coasts of these two intervening counties to afford an ideal home for it.

Linum usitatissimum L. Sporadic, roadside near Rhyl, *Fl. B.* —*L. angustifolium* Huds. Plenty in valley [below St. Beuno's], *Fl. B.*

Acer campestre L. In hedges on road before Llannerch Bridge, *Fl. B.*; near Castle Walter, St. Beuno's, *Stapleton.*

Euonymus europæus L. "In the copse by Euloe Castle, near Hawarden," *Bingley*; "It is very infrequent this way. In one place only in this county of Flint," *Waring*; Chapel Rock, St. Beuno's, and Caerwys Wood, *Fl. B.*

**Rhamnus catharticus* L. Lower Rock Wood, St. Beuno's (*Rev. G.*) *Bliss, Fl. B.*

**Genista anglica* L. On side of stream flowing from Llyn Helyg; also cross country track from Llyn Helyg to the Holywell Road, near the Traveller's Rest, *Fl. B.*

Sarothamnus scoparius Wimm. By side of Ffynnon Beuno Brook, *Fl. B.*

Ononis spinosa L. Near Meliden, *Travis*; on road near Pont-yr-Cambwll; near Prestatyn, *Fl. B.*—*O. repens* L. Prestatyn neighbourhood, *Travis*; between Shotton and Connah's Quay, *Payne.*

Medicago sativa L. Railway-embankment, Dyserth, *Fl. B.*; Prestatyn; by the railway north-west of Sandycroft.

Melilotus altissima Thuill. Found once near St. Asaph Railway-station, *Fl. B.*; Ferry Lane, Saltney, *Payne*; railway-bank near Mostyn; waste ground near Point of Air. — **M. officinalis* Lam. (*arvensis* Wallr.). Mostyn, 1898, *Mason.*

Trifolium pratense L. β **sylvestre* Syme. Rhydymwyn, 1903, *Mason.*—**T. medium* L. Rhydymwyn, 1903, *Mason.*—*T. arvense* L. Between Chapel Rock and Tremeirchion, *Fl. B.*; Hawarden Station, *Payne.* — **T. striatum* L. In profusion on the common near Marian, Cwm, 1907, *Macdonald*, sp. — **T. hybridum* L. Rhydymwyn, 1903, *Mason.*

Anthyllis Vulneraria L. Near Mold, *Payne*; Pennant lead-mine, and very plentiful on the railway-embankment at Dyserth, *Fl. B.*

**Vicia hirsuta* Gray. On right bank of road to Rhuallt, *Fl. B.*; side of lane east of Trefrwd Farm, near Nerquis. — **V. tetrasperma* Moench. Abundant in some fields in front of St. Beuno's, *Fl. B.* — **V. angustifolia* L. Between Hawarden and Sandycroft, alt. 100 ft., June, 1907. — **V. lathyroides* L. On Chapel Rock, *Fl. B.*

**Ornithopus perpusillus* L. Sandy lanes between Bodfari and Caerwys; in old quarry on right of road to Cwm; on road between Caerwys and Bodfari, *Fl. B.*

**Onobrychis viciæfolia* Scop. (*sativa* L.). Near Prestatyn, *Fl. B.*

Prunus Padus L. "In woods and hedges in the neighbourhood of Mold, very common," *Bingley* (1804); in quantity in many places between Mold and Nerquis; several shrubs by the road from Nannerch to Llandyrnog at point where lane branches to Gwrych Bedw.—*P. Avium* L. Between Mold and Rhual; Bryn Ffynnon; Caergwrle. — *P. insititia* Huds. Much commoner around St. Beuno's than *P. spinosa*, *Herb. B.*

Spiræa Filipendula L. Roadside between Cwm and Rhuallt, *Day.*

Rubus dumetorum W. & M. *β diversifolius* Lindl. Thicket between road and railway near Mostyn Station, *W. & D.* — *R. rusticanus* Merc. With the last.—*R. Sprengelii* Weih. In thicket with preceding. — **R. saxatilis* L. Top of "Blackberry Lane" (*i. e.* lane leading from Rock Chapel to Aelwyd uchaf), *Fl. B.*

Sanguisorba officinalis L. Rhydymwyn, *Payne.*

Agrimonia Eupatoria L. Near Dyserth, *Travis*; field below St. Beuno's College.

Comarum palustre L. Fields in valley in front of St. Beuno's, *Fl. B.*; swampy ground in field a little distance south-west of Nannerch.

Geum rivale L. "In many damp parts of the woods here (*i. e.* Leeswood) so abundantly that a great deal of ground is entirely covered with it," *Waring*; common in Caerwys Wood, and on the Mold Road beyond Nannerch, *Fl. B.* — **G. intermedium* Ehrh. "I once found it on a rock in a wood near this place" (*i. e.* Leeswood), *Waring*; Caerwys Wood, especially between the two reservoirs, *Fl. B.*

Rosa mollis Sm. var. **recondita* Puget. Near the "Loggerheads" (*Harold J. Wheldon*); this may have been obtained in Denbigh.—*R. tomentosa* Sm. In thicket by road near Mostyn Station, *W. & D.*—**R. rubiginosa* L. Chapel Rock, *Fl. B.*—**R. lutetiana* Leman. In thicket by road near Mostyn Station, *W. & D.*—*R. dumalis* Bechs. Chapel Rock, *Fl. B.*; hedge near Point of Air, *W. & D.* — *R. urbica* Leman. Roadside between Mostyn and Ffynnon Groew, *W. & D.* — *R. arvensis* Huds. Fields below St. Beuno's College, *Fl. B.*

**Pyrus Aria* Ehrh. On way to Chapel Rock, *Fl. B.*; two small shrubs in hedge by lane above Trefrwd Farm, at about 800 ft., May, 1907.

Lythrum Salicaria L. Abundant on the Clwyd; fields in valley in front of St. Beuno's, *Fl. B.*, *Stapleton*; Mold, 1903, *Mason.*

Bryonia dioica Jacq. "Near Talacre, and in hedges on way to Voil (Moel Hiraddug); near Point of Air," *Fl. B.* Several plants on the inland side of the sandhills near the Lifeboat Station, below Gronant; in quantity in hedges in the lane between Gronant and St. Elmo's Summerhouse.

**Sedum album* L. On a roof near Tan-yr-Allt, Meliden; probably an escape.—*S. reflexum* L. Hawarden Bridge, *Payne*; wall by roadside west of Rhuallt.

Cotyledon Umbilicus L. Plenty on the old Holywell Road, *Fl. B.*

Ribes rubrum L. In several places by the stream along the Leet; wood on west side of the road between Hawarden and Pentrobin.

Chrysosplenium alternifolium L. Nant-y-Flint, *Brit. Assn. Handb.*; near Caergwrle, 1904.

Parnassia palustris L. Ditches by roadside near Point of Air, *Fl. B.*

Drosera rotundifolia L. In boggy ground on stream just below Llyn Helyg, *Fl. B.*; marsh above Ffynnon Beuno, *Fl. B.*

**Myriophyllum alterniflorum* DC. Llyn Helyg, *Fl. B.*

**Hippuris vulgaris* L. "In a ditch about a hundred yards north-west of Rhyd Marsh, near Prestatyn," *Bingley*; Rhyl Marsh, in ditches, *Fl. B.*

Conium maculatum L. Gwaenysgor; between Gronant and Prestatyn.

**Cicuta virosa* L. "Sium alterum Olusatri facie. Long-leaved watercresses, was found by M. George Bowles . . . . in divers ponds in Flintshire," *Gerard, Herball.* 1633, p. 257. This, the only Flint record given by Gerard, probably refers to the isolated portion of the county situate in Shropshire. There is a faint possibility of Flintshire proper being intended, and in the absence of direct evidence to the contrary I have thought it advisable to quote this record.

Apium graveolens L. Marsh between the road and the railway between Mostyn and Ffynnon Groew. — *A. inundatum* Reichenb. Damp ground near Point of Air.

Sison Amomum L. Bumper's Lane, *New*; corner of main road near Waen.

Sium erectum Huds. (*angustifolium* L). Mostyn; Blacon Brook, *New.*

Pimpinella Saxifraga L. c. **dissecta* With. Rhydymwyn, 1903. *Mason.*

[*Œnanthe aquatica*, Poir (*Œ. Phellandrium* Lam.). Pennant includes this species in his *Hist. Whiteford*; no one else—save J. F. Robinson, of course—appears to have noticed this plant in the county].—*Œ. fistulosa* L. Pond to right of road to St. Asaph, *Fl. B.*

Heracleum Sphondylium L., *β.* **angustifolium* Huds. Wood near St. Asaph, *Fl. B.*; Rhydymwyn.

Fœniculum vulgare Mill. On roadside just beyond Dyserth Church, *Fl. B.*

Silaus flavescens Bernh. (*pratensis* Bess.). Near Mold, *Payne.*

Torilis nodosa Gaertn. About Gwaenysgor.

Scandix Pecten-Veneris L. "Cultivated fields by the foot-path, starting from the centre of Prestatyn towards Rhyl, July, 1885, R. B." *Herb. Brown*; Cwm, *Macdonald*; corner of road near schools, Dyserth; also in raised hedge to right of second field in front of St. Beuno's; a great deal in a field north-east of Voil; it seems common in fields about Dyserth, *Fl. B.*; near Hendre Isaf, near Nerquis.

**Chærophyllum Anthriscus* Lam. (*Anthriscus vulgaris* Pers.). Corner of road near schools, Dyserth, *Fl. B.*; sandhills near Prestatyn.

Myrrhis Odorata Scop. Quarry between Ysceifiog and Afon Wen, *Fl. B.*; by stream near Broncoed, between Mold and Nerquis; bank of stream near Trefrwd; near Nerquis.

**Smyrnium Olusatrum* L. Penybryn, near St. Beuno's and other places, *Fl. B.*

**Symphoricarpos racemosus* Michx. An escape in several places; Cwm, *Macdonald*; Nannerch; Gronant.

**Viscum album* L. "In the village of Broughton," *Bingley*.

Galium Mollugo* L. Plenty between the beehives and Murphy's Walk (St. Beuno's), *Fl. B.*—G. uliginosum* L. Near Cwm, *Fl. B.*

**Rubia peregrina* L. Above Dyserth Waterfall, *Fl. B.*

Kentranthus ruber DC. Plenty about the old lead mines at Talargoch, *Macdonald*, sp.

Valeriana dioica L. Stream below Llyn Helyg; between Chapel Rock and Tremeirchion, *Fl. B.*; damp woodland above the Hendre Mine, north of Rhydymwyn, alt. *circa* 600 ft.

Valerianella olitoria Poll. Mostyn, *Mason*; Prestatyn; Nerquis; Nannerch; Caergwrle.—**V. dentata* Poll. Near Mold, *Payne*.

Dipsacus sylvestris Huds. Blacon Point, *New*; Dyserth, *Herb. B.*

Scabiosa Columbaria L. Dyserth, *Fl. B.*; The Marion, Cwm, *Macdonald*, sp.; Connah's Quay.

Erigeron acris L. Cwm, *Macdonald*.

Inula squarrosa Bernh. (*Conyza* DC.). Nant-y-Flint, *Brit. Assn. Handb.*; Chapel Rock, St. Beuno's, *Stapleton*; near Meliden, *Travis*; Mostyn Park.

Filago germanica Huds. Near Caerwys, *Herb. B.*; in road turning down to triangular walk from Cwm; and in road to Pont-y-Cambwl, *Fl. B.*—*F. minima* Fries. On big steep hill at back of Bodfari Mine, *Fl. B.*

**Gnaphalium sylvaticum* L. South slope of Cefn Du, Tremeirchion, among bracken, *Stapleton*; Cwm Woods, *Macdonald*.

**Antennaria margaritacea* Brown. Back of chapel, &c., *Fl. B.*

Chrysanthemum segetum L. Field back of Tremeirchion; quarry opposite fir wood, *Fl. B.*; Pen Uchaf near Tremeirchion, *Stapleton*; a curiously uncommon plant in Flintshire.

Artemisia Absinthium L. Cwm, *Macdonald*; by farm in lane east of Cefn Du, Tremeirchion, *Stapleton*; Prestatyn.

Tanacetum vulgare L. Roadside near Gwespyr; lane-side between Nerquis Hall and the Mold, and Wrexham Road.

**Doronicum Pardalianches* Linn. Roadside beyond Rhuallt, *Fl. B.*

Senecio sylvaticus L. Lane west of Moel Maen Efa, *Stapleton.* —*S. erucifolius* L. Road to Pont-y-Cambwl, *Stapleton*; roadside between Gwespyr and Mostyn; field below St. Beuno's College.

Carlina vulgaris L. On the Voil, *Fl. B.*; Cwm, *Macdonald*; Hope Mountain; sandhills near Prestatyn.

Serratula tinctoria L. Fields in valley below St. Beuno's, once only, *Fl. B.*

Centaurea Scabiosa L. Between Shotton and Connah's Quay, *Payne.*

Onopordum Acanthium L. Above lime-kiln on way to Bodfari, *Fl. B.*

Carduus nutans L. It is not frequent in this part of the kingdom, where I have observed it only on the Bailey Hill at Mold (there but sparingly), and about Pont-Newidd, near Kilken, in this county, plentifully, *Waring*; native, and well scattered on the sandy ground about the Point of Air, *Brit. Assn. Handb.*; still there, 1907; one of the chief ornaments on the Voil, *Fl. B.*; Dyserth Castle Hill, *Fl. B.*—*C. crispus* L. Gwaenysgor.—*C. pycnocephalus* L. Close to a limestone cutting on the "Marian," near Cwm, *Macdonald*, sp.

**Silybum Marianum* Gaertn. About the castle at Caergwrle, and in two other places in this county of Flint, *Waring*; about Dyserth Castle, near Rhyddlan, *Bingley.*

Cichorium Intybus L. In pasture-field on Pen Waen Farm at Gwaenysgeor, *Macdonald*; Sealand Meadows, *Payne*; "Father Huson found it in field on right of stream opposite the Rifle Range," *Fl. B.*

Helmintia echioides Gaertn. On left of wood below St. Beuno's Farm *Fl. B.*

Tragopogon pratensis L. Mostyn Park; Dee Cop, *Payne.*—**T. porrifolius* L. In moist meadows in the parish of Whiteford, near Holywell, *Bingley.* This plant is also mentioned by Pennant in *Hist. Whit.*

Jasione montana L. Lane on west slope of Cefn Du, Tremeirchion, *Stapleton.*

Campanula latifolia L. Near Mold, *Payne*; Nant Figillt; woods about Talacre Hall; lane near Trefrwd Farm, Nerquis.—*C. Trachelium* L. Among the bushes near Basingwerk Abbey, *Bingley*; near Mold, *Payne.*

**Vaccinium Oxycoccos* L. Amongst *Sphagnum* in the swamp below and east of the small lake on Nerquis Mountain, close to the Denbigh border, alt. circa 1100 ft., May, 1907.

Primula veris L. Very plentiful along the Alyn Valley between Mold and Nannerch; parts of the limestone common about Lixwm and elsewhere are covered in May with a brilliant sheet of colour, due to the myriads of cowslip blossoms.—*P. veris* L. × *P. vulgaris* Huds. Fields in front of St. Beuno's and in Caerwys Wood, *Fl. B.*; wood on Tre Castel Farm, Dyserth, *Macdonald.*

Lysimachia Nummularia* L. Caerwys Woods, *Fl. B.*; near Mold, *Payne.*—L. vulgaris* L. Ty Gwyn, *Fl. B.*

Samolus Valerandi L. Mostyn, *Mason*; past Blacon Point, in a clubbed state, *New*; Point of Air.

Anagallis tenella Lightf. Plenty up valley of Wheeler (Chwiler) above Bodfari, and Ffynnon Beuno, *Fl. B.*

Pinguicula vulgaris L. Ffynnon Beuno and Llyn Helyg, and valley of Wheeler above Bodfari, *Fl. B.*; fields round Llyn Helyg, *Fl. B.*; south shore of Llyn Helyg, sparingly.

**Utricularia vulgaris* L. Pond in field below St. Beuno's College, *F. B.*; pond in furze-field, St. Beuno's, May 25th, 1885, *Herb. B.*

**Ligustrum vulgare* L. Rhydymwyn and Mostyn, *Mason*; Hawarden; on the limestone scar Coed-yr-Esgob, behind Prestatyn, where I should consider it native.

**Vinca minor* L. In the hedges by the roadsides near Pig-y-Trân, in the parish of St. Asaph, *Bingley*; just off turning off St. Asaph Road towards Rhuddlan; walls of Bryn-bella, but probably planted, *Fl. B.*

Menyanthes trifoliata L. Marshy ground by roadside, near Llyn Helyg, *Day*; in stream below Llyn Helyg, and pond in valley below St. Beuno's, *Fl. B.*

**Gentiana germanica* Willd. "The Marian," Cwm, *Macdonald*; limestone common skirting the road east of Glol, alt. 700 ft., Sept., 1907, *Rev. T. J. Walshe & A. A. D.*—*G. Amarella* L. Holywell Road and fields below St. Beuno's, *Fl. B.*; near Mold, *Payne*; fields below St. Beuno's, *Fl. B.*

Centaurion vulgare Hufn. (*Erythræa littoralis* Fries). Near Prestatyn, *Travis.*

Convolvulus Soldanella L. Above the shingle on shore Prestatyn way, *Fl. B.*

Cynoglossum officinale L. Common on Cwm Road and above Dyserth; also grows in St. Beuno's, field between the two rocks, *Fl. B.*; sandhills between Prestatyn and Point of Air.

**Echinospermum Lappula* Lehm. A casual by the old cement works, Prestatyn, 1907, *Rev. T. J. Walshe & A. A. D.*

Anchusa sempervirens L. Plentiful in Cwm Churchyard among the old gravestones, *Macdonald*; an escape about two miles north-west of Mold, by lane leading to Rhydymwyn.

Symphytum officinale L. Caerwys Wood, *Fl. B.*—**β patens* Sibth. Holywell, 1897, *Mason.*

**Lithospermum officinale* L. In fields round Dyserth, *Fl. B.*—*L. arvense* L. Fields below St. Beuno's College and also turning to right above the farm, in one of the fields on way to Llannerch, *Fl. B.*

Myosotis repens* G. Don. Ffynnon Beuno, *Fl. B.* Wood on both sides of road south of Hawarden, alt. circa 300 ft.—*M. sylvatica* Hoffm. Wood west of road south of Hawarden.—M. collina* Hoffm. In old quarry on road halfway to Cwm, *Fl. B.*

Echium vulgare L. Abundant near Point of Air; also casual at Ysceifiog, *Fl. B.*

(To be concluded)

BIBLIOGRAPHICAL NOTES.

XLIII.—Some Works of C. F. P. von Martius.

In the course of preparing the catalogue of the library at the Natural History Museum for the press it was found that the dates of issue of certain works by C. F. P. von Martius required investigation. The results of this are not completely satisfactory, but it is hoped that their publication may be the means of assisting others interested in the subject and perhaps of eliciting further information. The works in question are:—

I.—Historia Naturalis Palmarum, etc.

This book is divided into three "volumes," so-called, of which the first contains 198 pages, the pagination being given in Roman numerals, while the second and third have a continuous pagination in Arabic numerals, the total number of pages being 350. The plates run A–Z, Zi–xxiii, Geol. i–iii, Geogr. i–iv, and 1–180, with 6*a*, 11*a*, 18*a*, 50*a*, 59*a*, 73*a–d*, and 77*a*, besides a portrait. The whole came out in ten parts between 1823 and 1850.

Pt.	Pages.	Plates.	Date.	Authority.
Pt. 1.	pp. 1 [28 ?]	pls. 1–25.	1823	*Isis*, xvi, 1825, col, 868.
,, 2.	,, [29 ?–60 ?]	,, 26–49.	1824	
,, 3.	,, [61 ?]–90.	,, 50–67.	1824	
,, 4.	,, [91]–144	68–101, 6*a*, 11*a*, 18*a*, 73*a–c*.	[1826].	*Id.*, xxi, 1828, col. 275.
	(Pt. 1–4, also reviewed in *Linnæa*, i. 1826, pp. 113, 276.)			
,, 5.	,, i–lii.	,, A–Q.	1831.	*Id.*, xxxv, 1842, col. 798.
,, 6.	145–150, & 153–180	,, 102–[133 ?]	1837.	
,, 7.	,, 181–260.	,, [134 ?–164]	1838.	*Flora*, xxxii, 1849, p. 320.
(Pt. [6 & 7]. pp. 145–150, 153–260; pls. 102–164, Geol. i, and Geogr. i–iv, with 50*a*, 73*d*, and possibly also 59*a* and 77*a*, were issued Jan. 1837, and Sept. 1838; *Isis*, xxxv, 1842, col. 796–98.)				
,, 8.	,, liii–xcvi, 261–304	,, R–Zvii, Geol. ii, iii, 165–170	1845	*Isis*, xli, 1848, col. 620 and 625. *Flora*, xxxii, 1849, p. 317, 318.
,, 9.	,, xcvii–clxiv, 305–314	,, Zviii–xxiii, 171–180	15 Mar. 1849	*Flora*, xxxii, 1849, pp. 317–20.
,, 10.	[,, 315–350 & possibly also 151–2]	,, 1 portrait,	1850.	
(Pt. 9 and 10: sh. 110, 26 pls., 1 portr., 1849–50. Kayser, *Index Libr.* xii, p. 79.)				

II.—Nova Genera et Species Plantarum, etc.

The three volumes forming this work were issued in nine parts between 1823 and 1832, the title-page dates being 1824, 1826, and 1829. A manuscript list of the contents of the several parts of the first two volumes has fortunately been preserved in the Museum copy.

Vol. I.	Pages.	Plates.	Date.	Authority.
,, 1.	[pp. 1–20]	pls. 1–12.	1823.	*Isis*, xvi, 1825, col. 874.
,, 2.	[,, 21–36]	,, 13–24.	1823.	
,, 3.	[,, 37–80]	,, 25–55.	1824.	*Linnæa*, i, 1826, p. 113.
,, 4.	[,, 81–158]	,, 56–100.	1826.	*Id.*, *tom. cit.*, p. 279.
Vol. II.				
Pt. 1.	[pp. 1–72]	,, 101–160.	1826.	*Id.*, *tom. cit.*, p. 467.
,, 2.	[,, 73–148]	,, 161–200.	1827.	*Id.* ii., 1827, p. 480. Wikström, *Ars-Berat. Bot. Arbeten*, 1827 (1828), p 128.

(A review of the completed vols. i and ii appears in *Isis*, xxi, 1828, coll. 275, 276.)

Vol. III.				
Pt. 1.	[pp. 1–80]	pls. 201–231.	1829.	*Linnæa*, v, 1830, Litbl. p. 34 (em).
,, 2.	[,, 81–136 ?]	,, [232–278 ?].	1831.	Kayser, *Index Libr.* iv, p. 39.
,, 3.	[,, 137 ?–198]	,, [279 ?–300].	1832.	Colophon of the work itself.

(Reviews of the completed Vol. iii appear in *Isis*, xxxv, 1842, col. 798, and *Linnæa*, viii, 1833, Litbl. 51.)

III.—Icones Selectæ Plantarum Cryptogamicarum, etc.

This work was issued in four parts and has two title-pages, the one dated 1827, evidently in error, for the second one carries the true dates of publication, *viz.*, 1828–34.

Pt.	Pages.	Plates.	Date.	Authority.
Pt. 1.	pp. 1–30.	pls. i–xiv.	April, 1828.	*Linnæa*, v, 1830, Litbl. p. 71.

(Wikström, *Ars-Berat. Bot. Arbeten*, 1829 (1831), p. 25, gives 28 pages.)

Pt. 2. ,, 3. ,, 4.	,, 31–138.	,, xv–lxxvi.	1834.	Kayser, *Index Libr.* viii. p. 74.

IV.—Amœnitates Botanicæ Monacenses, etc. (*Auswahl merkwürdiger Pflanzen, etc.—Choix des Plantes remarquables, etc.*).

This work seems most freqnently quoted under its Latin title, which probably was that of the wrapper (unfortunately not preserved), for the two title-pages are one in German and the other in French. The work appeared in four parts, as follows:—

Pt.	Pages.	Plates.	Date.	Authority.
Pt. 1.	pp. 1–8	pls. i–v.	1829.	*Linnæa*, v. 1830, Litbl. p. 6, Wikström, *Ars-Berat. Bot. Arbeten*, 1829 (1831) p. 101.
,, 2.	,, 9–16	,, vi–x	1830.	Wikström, *op. cit.*, 1830 (1831), p. 125.
,, 3. ,, 4.	,, 17–26	,, xi–xiv.	1831.	Wikström, *op.cit.*, 1831 (1832) p. 125.

(Pt. 2–4 also reviewed in *Linnæa*, vi, 1831, Litbl. p. 15.)

B. B. Woodward.

SHORT NOTES.

Gaultheria Shallon Pursh, in the New Forest.—Early in May Professor Silvanus Thompson sent a flowerless branch of a shrub to Kew, asking whether it was *Gaultheria procumbens*, adding that he was not aware that *Gaultheria* grew wild in England.

It proved to be *G. Shallon*, which he found in "one of the wildest parts of the New Forest": "there was a bed of it growing along the banks of a small open drain or stream under oak-trees." In a later communication Professor Thompson gives full particulars of the locality, but it may be sufficient to state here that it is in a ride which runs south of the Blackwater, in a direction nearly east from a point on the high road between Lyndhurst to Christchurch, about half a mile south of the bridge over the Blackwater, to the next high-road on the east. *G. Shallon* is a native of Western North America, from British Columbia to California, and was introduced into English gardens by the unfortunate David Douglas in 1826. It has a fleshy good-flavoured berry, sparingly produced, I believe, in this country; but the appearance of the plant in the New Forest is probably due to the agency of birds. This, so far as I know, is the first record of its occurrence in a wild state in this country.—W. Botting Hemsley.

Additions to the Cornish Flora.—The following plants were added to the Cornish list during 1907:—*Sisymbrium Loeselii* L. Several large plants on a wastrel at Bissol in the Carnon Valley, v.-c. 1.—*Viola calcarea* Gregory. Sandhills in Perranzabuloe parish and at Porth Towan, v.-c. 1. Golf links, St. Enodoc, v.-c. 2.—*Vicia sylvatica* L. Near Port Isaac, v.-c. 2; Clement Reid. Two old records for West Cornwall have been considered unreliable.—*Rubus iricus* Rogers. Two places in Perranzabuloe parish; N. Tresidder. "Much the most characteristic British specimens that I have seen"; N. M. Rogers.—*Rosa omissa* Déségl. var. *resinosoides* Crépin. St. Erme, v.-c. 1; W. Tresidder. *Galium Cruciata* Scop. Sparingly at Port Quin, v.-c. 2; J. G. Baker. Long ago reported to have occurred in Cornwall, but considerable doubt attached to the records.—*Hieracium serratifrons* Almq. Roadside hedge near Falmouth, v.-c. 1; R. V. Tellam; a remarkable extension of the range of a very local species.—F. Hamilton Davey.

Middlesex Potamogetons: a Correction (p. 119).—Mr. Bennett, under the entry—"*P. obtusifolius* Mert. & Koch. Paddington. Sept. 9th, 1837. W. Wilson, in Cambridge Herb.!" has inadvertently quoted one of Wilson's Lancashire stations for this plant. Two years ago Mr. Charles Madeley, of the Warrington Museum, kindly sent for my inspection the Pond-weeds in the local herbarium. Among them were two sheets of *P. obtusifolius* collected by Wilson and labelled by him "*Potamogeton gramineus*. Pond at Padd^{n} (*sic*) Sep. 9, 1837," and "*Potamogeton compressum*. Pit in Orford Park. Aug., 1822." Under the guidance of Mr. Fryer I have just seen the specimen from Paddington in the Cambridge Herbarium; it is labelled in Wilson's handwriting "*P. gramineus*," and, curiously, the next sheet to it is *P. obtusifolius* from Orford Park, also collected and labelled by Wilson. Wilson lived for some years at Paddington, and Mr. Madeley informs me that before moving there he resided for some time at Orford.

Both places are quite close to Warrington, and are in v.-c. 59 S. Lancs. I believe *P. obtusifolius* has been for a long time extinct in these localities.—C. R. Billups.

Bracteate Form of Scilla non-scripta.—Mr. Arthur Way sends a cultivated specimen of this form which was originally found many years ago in a wood at Long Ashton, Somerset. The prolongation of both bracts gives the plant a remarkable appearance. Mr. Druce, who records it from various localities in Berkshire (Fl. Berks, 491), has named it var. *bracteata*, but according to Mr. Baker (Journ. Linn. Soc. xi. 256, 1870) this name had already been applied to the plant in gardens:—"forma hortensis adest (var. *bracteata* Hort.) bracteis valde elongatis 2 poll. vel ultra longis." To me it seems hardly to deserve a varietal appellation, as it occurs in a wild state growing among the ordinary form. Watson sent it to the Botanical Exchange Club in 1868, with a note which appears in the Report for 1869 (p. 14): "Garden examples show the variation of elongate and leaf-like bracts. The original bulb from which these garden plants have been derived was found in Claygate, Surrey, in the year 1838; and the variation has proved constant in the garden, the leafy bracts varying from 1 to 3 inches in length, according to soil and season." Briggs (Fl. Plymouth, 334) records "a plant with extremely long bracts, the lowest more than three times as long as the flower"; there is a specimen of this in the National Herbarium. It may be noted that the dedication of the plant to St. George, mentioned by Mr. Druce (*l. c.*), rests upon no old tradition but is one of the numerous inventions of Thomas Ignatius Maria Forster.—James Britten.

Overlooked Cape Plants.—The paper by C. F. Ecklon on "Plants found in the District of Uitenhage," 1829–30, published in the *South African Quarterly Journal*, i. 358–380, seems to have been to a considerable extent overlooked by botanists. It contains full descriptions of the following new species:—*Dioscorea sylvatica*, *Drimia uitenhagensis*, *D. nitida*, *D. ensifolia*, *Olea humilis*, *Chironia perfoliata*, *Logania capensis*, *Tabernæmontana Camassi*, *Arduina erythocarpa*, *A. hæmatocarpa*, *A. macrocarpa*. Of these the *Dioscorea* and two Drimias find no place in the *Index Kewensis*; *D. ensifolia* is cited from *Linnæa* xx. 235 (1847), where only the name appears; the *Chironia* is cited "ex Griseb. Gen. & Sp. Gent.," and the *Tabernæmontana* stands as *Kamassi*. In *Fl. Capensis* (vi. 253) the *Dioscorea* is quoted under *Testudinaria sylvatica* as of "Ecklon exsicc."; neither *Drimia uitenhagensis* nor *D. nitida* is mentioned, and *D. ensifolia* is placed under *Scilla Ludwigii*, with reference to *Linnæa* as above; where, by the way, *D. nitida* is also named, with a reference to Drège's n. 8616 *b*. The two former will no doubt be identified by those acquainted with the order, now that attention has been called to the descriptions; for the third Ecklon's specific name will have to be adopted, as the following synonymy will show:—

SCILLA ENSIFOLIA, comb. nov,
Drimia ensifolia Eckl. in. S. Afr. Quart. Journ. i. 364 (1830).
D. Ludwigii Miq. in Bull. Sc. Phys. Néerl. 1839, 39.
Idothea ? Ludwigii Kunth Enum. iv. 681 (1843).
Scilla Ludwigii Baker in Saunders Refug. Bot. iii., append. 9 (1870); in Journ. Linn. Soc. xiii, 248 (1872); and in Fl. Cap. vi. 488 (1897).—JAMES BRITTEN.

NOTICES OF BOOKS.

Mutation et Traumatismes : Etude sur l'Evolution des Formes végétales. By L. BLARINGHEM. 8vo, pp. 228. 8 plates. Price 10 fr. Alcan, Paris.

THIS is a very important work on experimental teratology, characterized by comprehensiveness, thoroughness, and careful carrying out of detailed experimentation. It is an extension of much of the work of De Vries on the same subject. The treatise tells us, as the result of the author's wide practical experience, the exact nature of the sudden adaptations on the part of the plant which occur as a result of very severe mutilations or traumatic treatment.

The first part consists of a detailed analysis of the causes which provoke abnormal changes in the sexual organs of the Maize. The same types of change were observed to occur in both the male panicle and the female "spike." Variations in the mode of nutrition and growth as the result of the application of artificial injury being the direct cause of the changes. As a result of the latter, the peculiar characters of the male and female inflorescence respectively became fused and indistinguishable, showing that both have a common origin in an *undifferentiated* primordium, the nature of the eventual development of which can be determined by the nature of the injury applied. The latter consisted in transverse and longitudinal cutting, and torsion of the stem sufficiently violent to involve the death of a considerable number of plants. The number of abnormal plants was in direct proportion to the degree of mutilation. It was also found that the period at which mutilation was applied is an important factor. The *later* the period at which the injury (*e. g.*, cutting off the main axis) is made, the more pronounced is the change of sex which is induced; the earlier it is made, the more feebly is the abnormal change manifested.

The second part contains an *exposé* of the facts which show that plants belonging to many widely different species behave in the same general way as does the Maize under traumatic treatment. Forced adaptation to unaccustomed conditions as a result of excision or torsion of the main axis of the plant is the phenomenon which expresses itself in the form of fasciated or twisted stems, coalescence of twigs and leaves, pitcher-shaped, forked or laciniate leaves, virescence of floral members, &c. I was personally pleased to find that the author affords a rational explana-

tion of "fasciation" in harmony with that of Moquin-Tandon. He says: "Les fascies résultent, non pas de la suture de jeunes organes qui restent cohérents pendant une période plus ou moins longue, mais bien d'une absence d'individualisation des cellules ou massifs de cellules en bourgeons indépendants." "La fascie résulte d'un retard dans la dissociation des parties." Some of his conclusions and results with regard to some of the individual phenomena observed are decidedly interesting; *e. g.*, he considers *ascidia* in leaves as comparable with that remarkable "sport" known as "ring-fasciation" in stems: he regards the phenomena of "scattered leaves," fasciation and torsions as special stages of a single phenomenon: that of the modification of the normal divergence of the leaves. *Biota orientalis* according to the author, is a fasciated (?) stable form of *Retinospora dubia*, obtained from seed; the female "spike" of the Maize really represents a fasciated lateral inflorescence of *Euchlæna mexicana*! By cutting off the main stem he induced the production of secondary rosettes in *Œnothera biennis*, in which were formed flowers and fruits; this phenomenon, which is abnormal in the subgenus *Œnothera*, is a normal feature of the subgenus *Œnotherium* of De Candolle!

The third part has for its object a study of the hereditary transmission of the floral anomalies of the Maize. His experiments have led to the rapid isolation of a large number of new, "ever-sporting" varieties, *e. g.*, plants with fasciated panicles and sexual metamorphosis of the flowers; with twisted panicles; with tubular leaves; with variegated leaves and albino seedlings; with red stems and leaves; with weeping habit; with dissociated "spikes." He succeeded in *fixing* two quite new forms: one whose lateral "spikes" bore spikelets which were morphologically, but not physiologically, hermaphrodite: *Zea Maïs pseudo-androgyna*. The other form is distinguished by well-marked differences in the form of the stem, the number of leaves, bracts and rows of grains, the compactness of the panicle and the density of the male and female spikelets; it is named *Zea Maïs* var. *semi-præcox*. But the most remarkable acquisition is the new elementary species (?) *Zea Maïs præcox*, which appeared *suddenly* and has shown itself to be *stable*. Its early flowering precludes its crossing with the most nearly allied form *Z. M. pennsylvanica* Bonafous. This plant is the only grass known which exhibits the partially hereditary anomaly consisting of the paleæ of the male flowers being changed into stigmas.

The great majority of the new forms were obtained from a single Maize-plant mutilated in 1902, and bearing a terminal panicle with male flowers changed into fertile female ones. The author has afforded evidence of the *mutational* character of the origin of this plant's descendants. His final conclusion is that severe and violent mutilations constitute a general and convenient method of inducing mutability in groups of plants which have hitherto been perfectly stable.

"The hereditary variations induced by wounding concern all

characters of the species, resulting in a splitting up of the type into multiple and distinct forms which are sometimes of a regressive nature, recalling the ancestors of the Maize, sometimes progressive, showing the acquisition by the species *Maïs* of characters new to the genus, tribe, and even family of *Gramineæ*. The study of the variations observed as a result of mutilations enables us to reconstitute the evolution of the genus *Zea*, and to establish the fact that the wild ancestor of the cultivated Maize is the species *Euchlæna mexicana*. The genus *Zea* is a monstrous form of the genus *Euchlæna* which has been originated and propagated by the agency of man . . . The facts in their entirety prove that *mutation is a very important factor in the evolution of vegetable forms*."

These are the remarkable and interesting conclusions reached by the author as a result of his extended experimental investigations.

There is a well-nigh exhaustive list of literature bearing on the subject, and eight plates from excellent photographs.

W. C. W.

Vorträge über Botanische Stammesgeschichte. Ester Band: Algen und Pilze. 8vo. 828 pp. VON J. P. LOTSY. Jena: 1907.

THIS is the first instalment of a work which Dr. Lotsy has in contemplation on the phylogeny of plants. It deals solely with Algæ and Fungi, and is intended to be followed by two volumes treating of the Archegoniates and Phanerogams respectively. It consists of a course of "Vorlesungen," and, as we learn from the preface, is the reproduction of lectures actually given by the author to the students of the Universities of Leyden and Utrecht. It extends over eight hundred octavo pages, and is profusely illustrated throughout.

Those who are engaged in the teaching of botany in this country, and who find it increasingly difficult to cover the whole vast field of Taxonomy, Morphology, and Physiology within the limits of a two years' course, during which the student is usually engaged in the study of one or more other scientific subjects as well as Botany, will look forward with interest to the publication of Dr. Lotsy's further volumes, in order to see how at any rate the phylogeny of the whole Vegetable Kingdom may be compassed within the limits of a single session. For the course here reproduced consisted of thirty lectures, and might therefore have been delivered within a single term in one of our universities; and in two more such terms it would seem that Dr. Lotsy would be able to dispose of the Archegoniates and the Phanerogams.

Probably no two persons would agree as to the relative amount of time which should be allotted to the three groups of plants into which Dr. Lotsy proposes to subdivide the whole for the purpose of this work, but it is probable that few will consider that either the Archegoniates or the Phanerogams can be adequately dealt with in two courses of thirty lectures each.

When the present volume is scrutinized in order to ascertain how even Algæ and Fungi are to be successfully brought within the limits of thirty lectures, it is with some disappointment it is discovered that the lectures cannot actually have been delivered on quite the same relative scale as they have been reproduced. It is found, for example, that Lecture 26 treats mostly of the Exoascineæ, and takes up only four pages. Lecture 8 treats mostly of Desmidieæ, and takes up seven pages, while Lecture 3 treats of Siphonales in the widest sense of the term, and takes up sixty-nine pages, and Lecture 30 treats of the whole of the Basidiomycetes and the Charophyta and runs to eighty-nine pages.

Leaving, however, this aspect of the treatment, and turning to the author's handling of his subjects, we have nothing but praise for the lectures and the figures which accompany them. Of the four hundred and thirty figures all but a very few are "process" reproductions of excellent wall-diagrams prepared originally, we learn, by Fraülein Ritsema, and actually used in the illustration of the lectures. As each of these reproductions occupies nearly half a page and contains often as many as a score of figures, the wealth of illustration may be imagined. The lectures themselves are thoroughly up-to-date, and there are no important recent investigations among the Thallophyta in any country but have been canvassed by the author. The portions dealing with Algæ naturally challenge comparison with Oltmann's great work in two volumes which appeared in 1904–5, and to which the author expresses his indebtedness. Within the limits at his disposal, however, Dr. Lotsy has handled the group with great thoroughness. The conception of the higher plant as a duality consisting of a generation whose nucleus contains x-chromosomes, alternating with another generation whose nucleus contains 2 x-chromosomes, is one which the author seeks to apply to the Algæ at every turn, and the recent great advances in our knowledge of their cytology has furnished him with interesting material to this end. Indeed, the endeavour to discover at what point in the life-history of each organism that reduction of chromosomes takes place which succeeds the doubling involved in the sexual process is acknowledged by the author to be a dominating consideration throughout the work.

On the side of the Fungi also we have an equally admirable digest of all the most recent contributions to knowledge. The phylogenetic conceptions of Brefeld are considered with due care, and the evidence for the existence of sexuality among Ascomycetes arranged with great skill.

The vivacity of the style, the excellence of the illustrations, the wide knowledge of the author of the literature of the subject, and the judgment displayed by him in the statement of contending views, combine to make Dr. Lotsy's book a noteworthy addition to the literature of botany. It will doubtless prove of great value both to teachers and students, and will induce them to look forward with interest to the promised volumes on the phylogeny of the higher plants.

R. W. P.

Monographie der Gattung Taraxacum. Von Dr. H. Freih. v. Handel-Mazzetti. 4to, pp. 175. 7 plates. Leipzig: F. Deuticke.

The recently-published *Monographie der Gattung Taraxacum*, by Dr. Heinrich Freiherr von Handel-Mazzetti, Assistant in the Botanical Institute of the Royal University of Vienna, is another remarkable example of Teutonic painstaking and thoroughness. The Baron, who has made himself the unrivalled authority on the Dandelions of the world, describes no less than fifty-seven species, forty-one of which are Asiatic, twenty-nine or thirty European, seven North American, three African, two South American, and two Australasian. Of course, it is legitimate to ask if it is worth while making species of our European varieties, as Hooker and most English authorities have considered them—such, *e.g.*, as *erythrospermum*, *lævigatum* and *palustre*; but other Continental botanists have done this long ago. Nyman, in his *Conspectus Floræ Europeæ*, divided the European Taraxacums into ten species, against Handel-Mazzetti's thirty. As an instance of elaborate work, we may mention that *T. lævigatum* DC. occupies seven pages of the monograph, of which the synonymy takes about a page and a third, and the distribution four, the plant being reported from all parts of Europe, Morocco, Asia Minor, Syria, Persia, Turkestan, and North America, in which last continent it is certainly introduced. We have noticed the Antarctic *T. magellanicum* Commerson, by the roadsides at Stanley, Falkland Islands, massed together with an almost inconceivable density.

There is in this monograph a careful, illustrated chapter on the morphology of the genus, and the book is further enriched by three lithographic plates from the author's excellent drawings of flowers and fruit, and two of beautifully-reproduced photographs of dried specimens of twenty-six species, half the natural size. Another photograph on the same scale (p. 66) demonstrates the variability of the northern *T. ceratophorum* DC. There are two useful maps, showing the distribution of the Old World forms. An interesting feature of the work is the "Historische Darstellung des Entwicklungsganges," with ingenious diagrams tracing the evolution of various groups from Pliocene times.

It is unfortunate that the author did not get some English friend to read his proofs; such errors as "sout" for south, "Chatam" for Chatham, "coart" for coast," &c., should not appear in so valuable a monograph.

R. M. M.

Plant Anatomy from the Standpoint of the Development and Functions of the Tissues, and Handbook of Micro-technic. By William Chase Stevens, Professor of Botany in the University of Kansas. With 136 illustrations. Pp. xii and 349. London: J. & A. Churchill. 1908. Price 10*s.* 6*d.* net.

Prof. Stevens is to be congratulated on having written an extremely useful elementary account of the physiological anatomy of plants. The book is an almost ideal one for that large class of

students who require a thorough grounding in the principles of histological construction and its relation to the vital needs of a flowering plant, without being bewildered by endless descriptive details unimportant to any but the specialist. For instance, the young pharmacist who aims at something more than a mechanical power of recognition of the histological elements of plants, together with a modicum of text-book botany got up by rote, will find the work under review, with its broad handling of the essentials, its hints on the most suitable objects for laboratory investigation at the end of each chapter, and its chapters on technique, on micro-chemistry, and on detection of adulterations in food and drugs, an admirable guide to the whole subject. He should be able to work through the book, paying full attention to the laboratory work, in the course of a year, without in any way neglecting the other branches of his training.

For a more academic botanical curriculum, Prof. Stevens's work is not, nor does it profess to be, sufficiently comprehensive to cover the whole subject, but it does form an excellent introduction to physiological anatomy, on which any desired superstructure may be securely built, and that, unfortunately, is more than can be said of the majority of text-books. The book owes this quality to the firm grasp and skilful handling of the great principles of plant-construction displayed by its author, together with a high degree of accuracy in description. In a succession of chapters he deals with The Plant Cell, Differentiation of the Tissues, Secondary Increase in Thickness, Protection from Injuries and Loss of Water, The Plant Skeleton, The Absorption of Water and Minerals, Circulation of Water and Soil Solutes, Intake and Circulation of Gases, Construction of the Plants' Food, Circulation of Foods through the Plant, Storage of Food and Water, Secretion and Excretion, and finally devotes five chapters to histological technique, micro-chemistry, and histological pharmacognosy. Never for a moment does Prof. Stevens allow the details of structure to become divorced in the reader's mind from the fundamental physiological processes going on in the plant. A valuable and original feature of the book is the presence of numerous diagrams illustrating the relations of the different tissues one to another, and the course of water and food-substances through the plant-body. These will be of very great assistance to the student in realizing the structure of the plant as a delicately adjusted machine.

There is not much that can be adversely criticized. The fundamental importance of enzymes as revealed by modern work is scarcely sufficiently insisted on in dealing with the activities of protoplasm in the first chapter. Some of the diagrams illustrating the second and third chapters are not wholly free from blemishes. Figure 11, for instance, gives a somewhat misleading idea of the relation of the leaf-trace to the vascular system of the stem. The relation of the true cambium to the zone of undifferentiated parenchyma between the xylem and phloem of the primary bundle is not well brought out. The radial seriation of

the cells of the cambium with those of the secondary tissues is not shown in the diagrams (figs. 14, 22), though the cell outlines are drawn in. "Procambium strands" is not a good name for the precursors of strands of "bast fibres" arising in the cortex. The statement that the endodermis is intended to reduce "permeability" between cortex and stele requires qualification. The statement that the function of the xylem parenchyma is (among other things) to "store reserve water" lacks justification. It is undesirable in the present state of morphological anatomy to apply the term "radial bundle" to the root-stalk. The term "borke" is scarcely suitable for direct importation into English. The reference to the mechanism of leaf-fall is inadequate. But the enumeration of these slight blemishes as the worst that can be found is in itself sufficient to show how free the book is from serious defects, and we cordially wish it a wide sale in this country.

A. G. T.

BOOK-NOTES, NEWS, &c.

The publisher of Rabenhorst's historic *Kryptogamen-Flora von Deutschland* has been fortunate in securing Dr. Karl Müller, of Freiburg, for the *Hepaticæ*. His enthusiasm, industry, and knowledge eminently fit him for the task. His numerous contributions to our knowledge during past years, crowned by his magnificent Monograph of the *Scapaniæ*, assure us that we may look forward with confidence to the completion of a thoroughly good Hepatic Flora; and it is to be hoped that there will be no delay in the regular appearance of the remaining ten to fifteen parts in which the work is expected to be completed. The work is copiously illustrated; most of the figures are original, and will be of great help to the student. Some are remarkably good, for example, *Riella heliocophylla* (p. 318). The drawings of *Riccia* are very beautiful, but in the closely related species I am afraid they will not be of much value in the determination of the different species. Although in the first place devoted to a description of German, Austrian, and Swiss species, the author gives a short description with notes of other European species, thus making it of more general interest to British as well as to Continental students. Parts i. and ii., and a portion of Part iii., are taken up with the Introduction, Structure, Systematic Arrangement, &c. In Part iii. begins the descriptive portion, with the genus *Riccia*, followed by *Ricciocarpus*, *Targionia*, *Reboulia*, *Fegatella*, *Marchantia*, *Sphærocarpus* in Parts iv. and v. After each species is given a list of synonyms, exsiccatæ, followed by a clear, concise description and interesting notes and observations. The work is evidently up to date: thus there is a description of *Riccia pseudo-Frostii* Schiffn. with a reference to its having been recently discovered in England by Mr. W. E. Nicholson (see Journ. Bot. 1907, 631), and a description of *Sphærocarpus californicus* Austin, a species recently found in France by Dr. Douin, which may be looked for in this country. Dr. Karl Müller may be congratulated on the excellence of the

first five parts, and it is sincerely to be hoped that he will be able to bring this useful work (which is published by E. Kummer, Leipzig) to a successful completion.—W. H. P.

At the meeting of the Linnean Society on April 2nd, the Rev. John Gerard, S.J., F.L.S., exhibited lantern-slides of "Vegetable Imitations or Mimicries," amongst them *Ophrys muscifera* and *O. apifera*; *Veronica tetragona*, once described as a Gymnosperm, and a *Dacrydium* which closely resembles it; and instances from the genus *Lysimachia* which appear to mimic *Paris* and other remote genera by their habit and foliage. A paper was read by Miss Winifred Smith, "On the Anatomy of some Sapotaceous Seedlings." The seedlings of the *Sapotaceæ* are remarkable on account of (1) their exceptional mode of transition from root to stem; (2) the lack of continuity in the different parts of the vascular system; (3) their tendency to a geophilous habit. To Dangeard's axiom:—"Le plan vertical médian des cotylédons correspond toujours à un faisceau vasculaire de la racine," the sole exceptions vouched for are trees, and occur in the *Sapotaceæ* and in two genera of the *Fagaceæ*. Here the vascular strands occupy the corners of a square whose sides are parallel to the cotyledonary plane and at right angles to it respectively. This orientation holds good from cotyledons down to root-apex. Though four is the characteristic number of vascular bundles, six, seven, or eight are met with. Cases are observed in which the root is hexarch or polyarch, and the hypocotyl is tetrarch. Also fresh cotyledon bundles may arise at the node. Twin bundles are the rule. The tendency to geophily is seen in the swollen hpyocotyl. This region is characterised by many rows of secondary xylem in some cases; in others, by lignification of the pith. In one genus a petiolar sheath encloses the plumular bud, and the cotyledons are partly fused at the sides. The variations observed can, as a rule, be easily correlated with the habits of the plants.

The Department of Agriculture for Ireland has issued with commendable promptitude the Report of the Committee appointed in August last year to enquire into and report on various matters relating to the improvement of forestry in Ireland. The Report, which is published by H.M. Stationery Office, Dublin, costs $6\frac{1}{2}d.$; the price of the Minutes of Evidence, Appendixes and Index (pp. 484) is 4*s.* 5*d.*

Messrs. Longmans have published a sixpenny edition (the fifth) of Father Gerard's *The Old Riddle and the Newest Answer* which was reviewed in this Journal for 1904, p. 190, on the occasion of its first publication.

The following explanation of Plate 489B should have been appended to Mr. Pugsley's paper on *Salvia Verbenaca* (p. 151):—

1.—Calyx of the Vazon Bay *Salvia* with hair-clothing and glands characteristic of the subspecies *S. Verbenaca*. 2.—Calyx of the Hampton Court *Salvia* with hair-clothing and glands characteristic of the subspecies *S. horminoides*. 3, 4, 5.—Proterandrous, intermediate and cleistogamous corollas of the Hampton Court *Salvia*, July, 1907. 6.—Large proterandrous corolla of the Vazon Bay *Salvia*, July, 1907. All about one and a-half times natural size. The glands of the two calyces are hardly sufficiently shown.

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JAMES BRITTEN, K.S.G., F.L.S.

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Landolphia chylorrhiza *Stapf.*

SOME SUFFRUTESCENT *APOCYNACEÆ* FROM ANGOLA.

By Otto Stapf, Ph.D., F.R.S.

(Plate 492.)

Eleven years ago the late K. Schumann,* of Berlin, recorded the existence in West Africa of so-called "root rubbers," that is, of plants which yield a latex containing caoutchouc from their rhizomes. They were *Carpodinus lanceolata* K. Schum., first known from the Lower Congo, and *Clitandra Henriquesiana* K. Schum., a native of Southern Angola. Six years later, two more "root rubbers" were noted—*Landolphia Thollonii*,† a species described by Dewèvre in 1895 from the Congo Free State, and *Carpodinus chylorrhiza* K. Schum.,‡ a plant discovered by H. Baum in the highlands of Benguella in 1900. *Carpodinus lanceolata* has since been recognized as practically useless from an economic point of view, whilst the other species form the principal sources of "root rubber" exported from Southern Angola and the Congo Free State. Nevertheless two of them remained up till now imperfectly known, no flowers having been obtained of *Carpodinus chylorrhiza* and no fruits of *Clitandra Henriquesiana*. Of the former even the generic position was uncertain. These gaps have now been filled through the exertions of Mr. John Gossweiler, who in 1905 and 1906 travelled in Southern Angola, and paid special attention to those plants. He also discovered a new species, nearly allied and very similar to *Carpodinus lanceolata*. The specimens collected by him, partly dried and partly preserved in formol, were incorporated in an extensive and valuable collection, communicated by him to the British Museum. They were kindly placed at my disposal by Dr. Rendle, and form the basis of the present paper.

From the flowers of K. Schumann's *Carpodinus chylorrhiza* it is now perfectly clear that it is really a *Landolphia* closely allied to *L. Thollonii*, as I suggested already in *Flora of Tropical Africa*, vol. iv. i. p. 58.

The generic character of *Clitandra Henriquesiana* is not affected by the discovery of the fruit, but Mr. Gossweiler's description of the flowers as blue emphasises still more the peculiar position which it occupies in the genus *Clitandra*, and which induced me to make it the representative of a distinct section, *Chamæclitandra*. No other species having blue flowers is known in *Clitandra* and its immediate allies.

Landolphia (§ *Eu-Landolphia*) chylorrhiza Stapf (comb. nov. et descr. emend.); affinis *L. Thollonii* Dew. a qua differt foliis magis coriaceis laxius nervosis, sepalis minus latis tenuissime

---

* K. Schumann in *Tropenpflanzer*, vol. i. (1897), pp. 134, 135, f. e.

† E. Laurent in *Belgique Coloniale*, 20 et 27 décembre, 1903, ex De Wildeman & Gentil, *Lianes Caoutchoutifères du Congo*, p. 117.

‡ K. Schum. in H. Baum, *Kunene-Sambesi Expedition*, p. 336.

pubescentibus, corollæ lobis angustioribus, fructibus seminibusque duplo majoribus.

Suffrutex dumosus, amplus, 20–40 cm. altus. *Rhizoma* lignosum, longe lateque repens. *Caules* magis minusque fasciculati, e basi ramosi, superne simplices, juveniles tenuiter fulvo-pubescentes, mox glabrati et cortice castaneo crebre lenticellato tecti, lenticellis pallidis vix elevatis. *Folia* opposita vel interdum subopposita, lanceolata, obtusa, basi subacuta, 4–6 (rarius 7) cm. longa, 1–1·5 cm. lata, coriacea, primo utrinque pubescentia vel ad margines costamque fulvo-villosula, sed diu ante maturitatem glabrescentia, matura interdum glaberrima, supra saturate viridia, nitida, costa nervisque flavescentibus, subtus pallida, costa supra latiuscule subcanaliculata, nervis lateralibus utrinque 12–15 sub margine arcuato-connectis supra prominulis subtus tenuissimis, venarum reticulatione laxa supra prominula subtus obscura; petiolus 2 mm. longus, pubescens. *Cymæ* terminales vel pseudo-axillares, congestæ, pubescentes, pedunculo brevi vel ad 2 cm. longo suffultæ; bracteæ oblongæ, ad 3 mm. longæ, inferiores caducæ; pedicelli brevissimi. *Calyx* 3 mm. longus, tenuissime rufo-pubescens; sepala late oblonga, obtusissima. *Corolla* in alabastro maturo ad 13 mm. longa, extus tenuissime velutino-puberula; tubus 5–6 mm. longus, supra medium ampliatus; lobi lineares vel oblongo-lineares, obtusiusculi, ad 7 mm. longi, 2–2·5 mm. lati. *Antheræ* acutæ, 1 mm. longæ. *Ovarium* ima basi excepta villosum; stylus glaber, cum stigmate fere 3 mm. longus. *Fructus* globoso-pyriformis, viridi-fuscus, ferrugineo-maculatus, 5 cm. longus latusque, cortice 3 mm. crasso sub epidermate strato sclerenchymatico firmato, pulpa ampla. *Semina* circa 12; cotyledones ad 15 mm. longæ, 9 mm. latæ; endosperma utrinque 3 mm. crassum siccando fere osseum. *Carpodinus chylorrhiza* K. Schum. ex Stapf in Thiselton-Dyer, Fl. Trop. Afr. iv. pp. 58 and 63; and in Baum, Kunene-Samb. Exped. p. 336, t. 5.

South-east Angola, common in the sandy plains (xanas, sannas, or t'hlanas) between 19° and 23° east long. and 15½° and 16½° south lat., and from 1200–1400 m.: near the River Kwiriri, above Sakkemecho, 1300 m., February 17th, 1900, with young fruits, *Baum*, 714! in the xana Mikango,* between the Rivers Kwiriri and Kwito, February 6th, 1906, with young fruits, *Gossweiler*, 2759! between Kassuango * (near the River Kwiriri) and Chinzul, October, 1906, in flower, *Gossweiler*, 3244! between the sources of the Rivers Ompaloi and Kumasso, August 20th, 1906, barren specimens, *Gossweiler*, 2653! near the River Kembo, August 27th, 1906, young flowering shoots, *Gossweiler*, 3217!

Clitandra Henriquesiana K. Schum. (fruct. descr.). Fructus pyriformis, subapiculatus, breviter crasse stipitatus, 8–9·5 cm. longus, 5–5·5 cm. diametro, rubro-castaneus, crebre minute lenticellatus, cortice coriaceo-carnoso 4 mm. crasso strato sclerenchymatico destituto. Semina 3–4 in pulpa ampla nidulantia,

* This is practically the same locality as Baum's.

fere ad 3 cm. longa et 2 cm. lata; endosperma utrinque 4 mm. crassum.

South-east Angola, "Cuango" (Kubango River?), between 14° and 16° south lat., *Marques*, 2! by the River Kuebe, in sandy soil near Kassinga, eastwards to beyond the River Kwito, October 23rd, 1899, in flower, *Baum*, 309! by the River Kambambe, east of the River Kebe, with young fruits, destroyed by frost, June 14th, 1906, *Gossweiler*! near the River Kwiriri, in gravelly soil, October, 1906, in flower, *Gossweiler*, 3237! 3274! March, 1906, in fruit, *Gossweiler*, 3697! in the xana Mikango, between the Rivers Kwiriri and Kwito, July 14th, 1906, in fruit, *Gossweiler*, 2806!

Gossweiler describes the flowers as blue, a colour not observed otherwise in *Clitandra* and the allied genera.

Carpodinus Gossweileri, Stapf (nov. spec.); affinis *C. lanceolatæ* K. Schum. differt foliis exsiccando flavescentibus minoribus magis coriaceis, venis subtus obscuris, cymis sessilibus vel subsessilibus, floribus paulo minoribus, seminibus fere 2 cm. longis.

Suffrutex dumosus, 50–100 cm. altus, raro scandens et tunc 5 m. altus, præter inflorescentias glaber. *Rhizoma* lignosum, longe lateque repens. *Caules* virgati, erecti, simplices vel basi parce ramosi, cortice castaneo tecti. Folia ternata vel opposita, lanceolata, obtusa, basi a medio sensim attenuata, 5–7 cm. longa, 1–1·5 cm. lata, chartaceo-coriacea, exsiccando flavo-viridia, supra lucida, subtus nigro-punctata, costa supra angustissime canaliculata, nervis lateralibus patulis subobscuris utrinque circiter 12 sub margine arcuatim connectis; petiolus 2–4 mm. longus. *Cymæ* paucifloræ, coarctatæ, sessiles vel subsessiles, terminales et secundum totum caulem axillares, minute rufo-puberulæ; pedicelli vix ulli; bracteæ oblongæ, 1–1·5 mm. longæ. *Calyx* 3 mm. longus; sepala 5, oblongo-ovata, obtusa, puberula, ciliolata. *Corolla* flavescens, fragrans, glabra; tubus superne leviter ampliatus, 6–8 mm. longus; lobi lineares, subobtusi, ad 9 mm. longi. *Antheræ* 1 mm. longæ. *Ovarium* ima basi glabrum, cæterum uti stylus 5 mm. longus, tenuiter pubescens. *Fructus* pyriformis, viridis, ferrugineo-maculatus, ad 7 mm. longus, ad vel ultra 5 cm. diametro, cortice carnoso 6 mm. crasso. *Semina* pauca in pulpa nidulantia, fere 2 cm. longa, ad 14 cm. lata, fere 1 cm. crassa.

South-east Angola, from the River Kunene to beyond the River Kwito, and between 15° and 16½° south lat., in light sandy soil in open grassy woods and savannas: between the Rivers Kunene and Kubanke, plentiful in open woods, August 4th, 1905, *Gossweiler*, 1813! Inkangulla Forest, above the origin of the watercourse Kwireka, which empties into the River Kutato, August 26th, 1905, *Gossweiler*, 1895! near the River Kambambe, between the Rivers Kebe and Kwartiri, 1500 m., January, 1906, *Gossweiler*, 2621! in the xana Ompaloi, near the River Kwanavol, September 5th, 1906, *Gossweiler*, 2592!

Gossweiler describes this *Carpodinus* as an under-shrub, usually only 60–90 cm. high, but occasionally giving off long sarmentose shoots, which, when they have the support of a tree, climb on it

up to a height of almost 5 m. All parts of the plant contain latex, but in small quantities. It is known as "Vivungo" in the western part of its area; but according to Gossweiler this name is also applied to *Carpodinus gracilis* Stapf.

EXPLANATION OF PLATE 492.

1. Whole plant of *Landolphia chylorrhiza* with rhizome, reduced. 2. Portion with young fruit, natural size. 3. Branch with young inflorescence, natural size. 4. Part of cyme with an open flower, natural size (from a specimen preserved in formol). 5. Calyx, 6 ×. 6. Flower, cut open, 6 ×. 7. A stamen, 18 ×. 8. Fruit, natural size (from a specimen preserved in formol). 9. Part of a section of the same, natural size. 10. Embryo, natural size.

PLANTS OBSERVED NEAR MOFFAT, DUMFRIES, JULY, 1907.

BY W. R. LINTON AND E. S. MARSHALL.

OUR stay lasted about ten days; we lodged with Mr. J. T. Johnstone, who knows the plants of the district very well, and kindly accompanied us on several occasions. My lamented friend Rev. W. R. Linton revised my rough notes, and would probably have supplemented those on the critical hawkweeds had he survived. Although the great heat at first made climbing difficult, the season was unusually backward, and some plants were not sufficiently advanced for determination. In this well-worked neighbourhood we could not hope to make many additions (new records for v.-c. 72 are starred); but a good many stations were ascertained which are not given in Mr. Scott Elliot's *Flora of Dumfries*.—E. S. M.

Thalictrum alpinum L. Correifron; Midlaw Burn.—*T. minus* L. (*collinum* Wallr.). Two distinct-looking forms grow at and above the Grey Mare's Tail; one tall, large-leaved, glabrous, the other about a foot high, more delicate, and somewhat glandular, though less so than *T. odoratum* Gren. & Godr., as described by Rouy & Foucaud, *Fl. de France*. These are doubtless the b. *montanum* and c. *flexuosum* of the *Flora*.

Ranunculus hederaceus L. Ascends to over 1000 ft., associated with the cranberry, between the upper Kinnel Burn and Ernecraig Hill. *Cardamine pratensis* L. reaches nearly 2000 ft. on Correifron.

Cochlearia alpina Wats. Common on the mountains; luxuriant in the upper ravine of the Midlaw Burn.

Silene maritima With. Correifron (1800 ft.); Black's Hope. Not given for these hills in the *Flora*.

Cerastium vulgatum L. (*triviale* Link) var. **fontanum* (Baumg.). Alpine rills on Black's Hope, at about 2000 ft.

Stellaria nemorum L. Frenchland Burn.

Vicia Orobus DC. Ernecraig Hill (*J. T. J.*).

Prunus Padus L. "Apparently always planted" (*Flora*). Clearly native in several stations—*e. g.* high up the Kinnel Water, a long way from any cultivation.

Rubus fissus Lindl. and *R. plicatus* Wh. & N. Raehills. — *R. pulcherrimus* Neum. Here and there, near Moffat, but not plentiful.—**R. villicaulis* Koehl. Moffat, and near Raehills.—*R. dasyphyllus* Rogers. Apparently quite common.—*R. Chamæmorus* L. Near the Midlaw Burn (about 1300 ft.).

Alchemilla vulgaris L. The prevailing alpine plant is glabrous (var. *alpestris* Pohl); but we met with var. *filicaulis* (Buser) in Correifron, up to 1700 ft.

Saxifraga hypnoides L. The plant of Black's Hope, Midlaw Burn, Correifron, and Craigmichen is this species, often somewhat luxuriant; we could see no *S. sponhemica*, and believe that it was recorded in error.

Epilobium anagallidifolium Lam. Midlaw Burn, at 1500 ft.; a satisfactory confirmation of the old record ("*alpinum*"), which had been doubted. Fine *E. alsinefolium* Vill. grew in Correifron.

Circæa alpina L. Raehills Glen.

Galium asperum Schreb. (*sylvestre* Poll.). Common on the higher hills; ascending to 1500 ft. or more.

Asperula odorata L. Raehills Glen; *Valeriana pyrenaica* L. is naturalised here.

Hieracium centripetale F. J. Hanb. Ernecraig Hill (*J. T. J.*); stream-sides in Black's Hope Glen. This district appears to be its headquarters; elsewhere it is usually quite scarce and very local. — *H. pseudonosmoides* Dahlst. The Dumfries-shire plant referred to this is decidedly more alpine than elsewhere; it was not yet in full flower, but looked to me (E. S. M.) considerably different from our ordinary form. Correifron and the Beeftub are unrecorded stations. *H. argenteum* of this neighbourhood is also not quite normal, the foliage being less glaucous, usually broader and more dentate. — *H. stenolepis* Lindeb. var. *anguinum* W. R. Linton. Kinnel Burn; Correifron; Midlaw Burn; Selcoth Burn. — *H. silvaticum* Gouan var. *micracladium* Dahlst. Evan Water; Well Burn; Correifron; Raehills Glen. A very different plant, which W. R. Linton was inclined to place under *H. silvaticum*, and sent to Scandinavia for determination, occurred by the Frenchland Burn, and (as a taller shade-grown form) by the Duff Kinnel Burn, near Raehills House. —**H. sagittatum* Lindeb. var. *philanthrax* Dahlst. Streamlet (Threepen Burn?), close to its junction with the Kinnel Burn. "I think it is just the same as the plant so named from Perth and W. Yorks" (W. R. L., *in litt.*). I independently determined it as identical with the Glen Shee gatherings of 1906 (E. S. M.).—*H. sarcophyllum* Stenstr. Kinnel Burn; Selcoth Burn, &c. In this neighbourhood the leaves are usually more or less blotched, unless it is shade-grown.—*H. duriceps* F. J. Hanb. var. *cravoniense* F. J. Hanb. Raehills Glen and Duff Kinnel Burn; Evan Water; Black's Hope; Correifron. New to this part of the county; less uniformly stylose-liguled than usual.—*H. vulgatum* Fr. Generally distributed and typical at low levels by streams, on railway-banks, &c. — *H. duplicatum* Almq. var. *stenophyes* W. R. Linton. Selcoth Burn; very local and scarce. — *H. stictophyllum* Dahlst. Evan Water; Duff Kinnel Burn. — *H.*

strictum Fr. Raehills Glen. A form or var. with densely canofloccose peduncles, which (as well as the young buds) have many long white hairs, grows on railway-banks near Beattock Station, and by the adjoining Evan Water. — *Obs.* We saw nothing of *H. nigresens*, *callistophyllum*, *Langwellense*, *nitidum*, *ciliatum*, or *angustatum*, which have been reported. On a hawkweed which grew sparingly with *H. duriceps* var. *cravoniense* on rocks by the Kinnel Water in Raehills Glen, W. R. Linton wrote:—"I believe this is a small state of *H. longilobum* Dahlst. It is the same plant as the one near the top of the Midlaw Burn, which in my book is wrongly placed with *oxyodus* (*oxyodus* being a pilose-headed plant)." It agrees closely with specimens received from W. R. L.

Taraxacum palustre DC. In an aggregate sense this is common on the hills up to 2000 ft. (I suspect that it may in part be *T. spectabile* Dahlst.; but no specimens were taken, and I have not seen that segregate.)

Jasione montana L. var. **major* Mert. & Koch. Old Edinburgh Road, about two miles from Moffat.

Campanula latifolia L. Raehills Glen; very local, but evidently native.

Pyrola minor L. Duff Kinnel Burn.

Euphrasia Rostkoviana Hayne. Not uncommon in low-ground meadows; particularly fine on the way to the Beeftub.—**E. brevipila* Burnat & Gremli. Common.—*E. gracilis* Fr. Near Raehills. — **E. scottica* Wettst. Frequent in boggy ground, ascending to at least 1200 ft.—**E. curta* Wettst. var. *glabrescens* Wettst. Beeftub; Correifron; Black's Hope; probably general on the hills.

**Rhinanthus borealis* Druce. Sparingly on the cliffs of Black's Hope and Correifron.

Melampyrum pratense L. var. **hians* Druce. Abundant in Raehills Glen; Midlaw Burn, at about 1300 ft. Mr. Johnstone informed us that this was the usual low-ground form of the district.

Pinguicula vulgaris L. var. **bicolor* Nordstedt. Black's Hope, Midlaw Burn, &c.; often characteristic, but intermediates between this and the type are frequent.

Mentha piperita L. Roadside near Hillhead, well established.

Ulmus glabra Huds. (*montana* Stokes). This and *Betula tomentosa* Reit. & Abel (*pubescens* Ehrh.) are clearly true natives.

Salix caprea L., *S. cinerea* L. Raehills Glen. — **S. aurita* × *phylicifolia*. Kinnel Burn, a female plant. — *S. phylicifolia* L. Kinnel Burn, &c. — *S. nigricans* Sm. Burn descending from Saddle Yoke to the Black's Hope Burn; Tail Burn. In this latter station grew two barren bushes, which at the time were taken to be forms of *nigricans*; but they are very possibly *S. Lapponum* × *nigricans*, the only station in the county for *Lapponum* being on the rocks of White Coombe, the drainage from which falls into this stream. The wood, buds, and foliage favour such a parentage; the material, however, does not admit

of certainty. — *S. purpurea* L. Plentiful by the Kinnel Water, a little above Raehills Glen.

Empetrum nigrum L. Sparingly on a bank in Raehills Glen; a remarkably low situation for an inland county.

Orchis ericetorum Linton. Common; restricted *O. maculata* was seen at Capelgill, and near the Kinnel Water not much below its junction with the Duff Kinnel Burn.

**Habenaria conopsea* × *Orchis maculata.* One specimen was found with the parents by W. R. L. in a bog near Capelgill; *H. conopsea* is fairly common.

Luzula albida DC. Raehills Glen; an escape.—*L. multiflora* Lej. A striking form grows in Correifron and elsewhere, reaching 1800 ft. Mr. Arthur Bennett writes:—"I think this is near *nivalis* Koch, *L. campestris* var. *nivalis* Wahlenb. Koch says '= *alpina* Hoppe'; but that belongs to *L. sudetica* = *L. nigricans* Desv."

Scirpus pauciflorus Lightf. Near Kinnelhead.

Carex remota L. Raehills Glen; also *C. helodes* Link (*lævigata* Sm.).—*C. curta* Good. Moorland between the Kinnel Burn and Ernecraig Hill, at 1000 ft. or more.—*C. fulva* Host (*Hornschuchiana* Hoppe). Frequent. — *C. Œderi* Retz. var. *œdocarpa* And. Common; the only form of aggregate *C. flava* L. which we observed. — *C. inflata* Huds. (*ampullacea* Good.). Midlaw Burn; Craigmichen Scaurs; moorland above the Kinnel Burn, &c.

Avena pratensis L. var. *alpina* (Sm.). Beeftub Rocks; several tufts.

Sieglingia decumbens Bernh. Black's Hope, &c.

Melica montana Huds. (*nutans* auct.). Raehills Glen. — *M. nutans* L. (*uniflora* Retz.). Frenchland Burn.

Poa nemoralis L. Midlaw Burn; Correifron—at about 1500 ft. in both stations.

Glyceria fluitans Br. var. **triticea* Fr. Apparently frequent in marshy ground. — **G. declinata* Bréb. Frenchland Burn; Kinnelhead.

Festuca rubra L. var. **grandiflora* Hackel. Black's Hope; Beeftub. — Var. **barbata* Hackel. Correifron; Midlaw Burn; Selcoth Burn. Florets villous; usually associated with the type. —Var. **fallax* Hackel. Shaded wall-tops, Old Edinburgh Road.

Bromus ramosus Huds. Raehills Glen.

Agropyron caninum Beauv. Evan Water; Raehills Glen.

Asplenium viride Huds. Below 800 ft., on shaded rocks above the Selcoth Burn.

Polystichum aculeatum Roth. Raehills Glen.

Lastrea spinulosa Presl. In the upper ravine of the Midlaw Burn, above 1500 ft.; probably var. *glandulosa* (Newm.). — *L. aristata* Rendle & Britten (*dilatata* Presl) is very luxuriant in Raehills Glen.

Equisetum sylvaticum L. var. *capillare* (Hoffm.). Raehills Glen.

NOTES ON SWISS *MYCETOZOA*.

By A. and G. Lister.

The following species were collected during the last few years in Switzerland, on high ground, most frequently in the neighbourhood of melting snow. They are interesting as showing certain characteristics due apparently to their alpine surroundings, namely, great variation in the shape and size of the sporangia, in the nature of the deposits of calcium carbonate, in the structure of the capillitium, and often in the large size of the spores. This alpine habit is referred to by Dr. R. E. Fries in an interesting paper on the myxomycetes of the mountain tracts of Jämtland, North Sweden,* where he draws attention to the fact that similar forms of the same species have been found repeatedly in similar situations in Sweden and Switzerland, and to some extent also in North Italy and California. The gatherings here described confirm his observations.

Physarum virescens Ditmar var. alpinum, n. var. On the under side of a leaf of *Sieversia montana* Spreng, above Arolla, Vallais, 2700 m. alt., July, 1907 (*G. Lister*). The specimen consists of two compact groups of ochraceous yellow sporangia, forming curved and confluent plasmodiocarps about 0·8 mm. diam.; the sporangium-wall is double, the calcareous outer layer tending to break away from the membranous inner layer; the capillitium shows abundant and rather large simple or branching yellow lime-knots, connected by firm hyaline threads with broad membranous expansions; the spores under a high magnifying power are rich purple-brown, closely and minutely warted, and measure 10 to 15 μ diam. An almost similar specimen, but with more globose sporangia, was gathered at the Blue Cañon, California, by Dr. Harkness, over forty years ago, and was named by the late W. Phillips "*Badhamia inaurata*"; it is referred to in the British Museum Catalogue (p. 61) under *Physarum rubiginosum* as being of uncertain affinity. These specimens are clearly very nearly allied to *P. virescens* Ditmar, var. *nitens* List.; they differ in the larger sporangia with double walls, the more rigid capillitium, and the darker, and, on the whole, larger spores; we therefore distinguish the form as var. *alpinum* of *P. virescens*.

P. vernum Somm. Abundant on turf and stones near melting snow in many places in the Cantons Vallais and Grisons, in the months of June and July, 1905, 1907. These are similar forms to Sommerfelt's type, gathered near Christania in 1827; the long flexuous plasmodiocarps are larger than we usually meet with in England, where this species is common on old straw heaps and among dead leaves. It often so closely resembles *P. cinereum* Pers. as to be indistinguishable except by the larger and rather darker spores; even this character may vary in different sporangia of one development, and on the whole it would seem more satis-

* "Myxomycetenfloran i de Jämtländska Fjälltrakterna," *Arkiv för Botanik*, Bd. 6, No. 7 (1906).

factory to regard *P. vernum* as merely a robust dark-spored variety of *P. cinereum*.

CHONDRIODERMA NIVEUM Rost. This is by far the most abundant species on the Swedish and Swiss Alps. Above Arolla, in July, 1907, many hollows from which the snow was disappearing were conspicuously sprinkled with white patches of the sporangia; those farthest from the snow were already weathered, having lost capillitium and spores, and were rapidly being hidden by the spring growth of flowers and grass, while half under the melting edge of the snow fresh clusters of sporangia were forming on the pressed brown turf, showing that the plasmodium stage must often be passed under the snow itself. The numerous specimens show great variety in the size of the sporangia, which may be sessile or shortly stalked, in the shape and colour of the columella, in the colour and mode of branching of the capillitium, and in the colour, size, and roughness of the spores; in fact, we have every combination of the characters that have been ascribed both to *C. niveum* Rost. and *C. Lyallii* Mass. *C. Lyallii* cannot therefore be regarded as a distinct species, and must be reduced to the position of var. *Lyallii* of *C. niveum*; see Schinz, *Die Myxomyceten der Schweiz*, p. 52, 1906.

It is curious that the var. *deplanatum* of *C. niveum*, a plasmodiocarp form without columella, appears to have been obtained only from Portugal,* and from the British Isles; with us it is the one form of the species yet found, if we except a specimen gathered in a mountain glen in North Wales, which shows the orange-brown floor of the sporangia ridged to form a distinct columella.

C. TREVELYANI Rost. This species seems to be nowhere common; it has been obtained from the British Isles, Sweden, Germany and Switzerland, and in North America from the States of Washington, Colorado, and California. In July, 1907, we gathered it in some abundance in hollows on the Alps where snow had recently lain. The inconspicuous mottled brown sporangia were spherical and nearly sessile; a few were extended into long and narrow, or broad and plate-like plasmodiocarps. When mature the walls dehisced in revolute lobes, and the capillitium and spores were soon dispersed, exposing in most instances a smooth and shining floor. In some sporangia, however, a distinct columella is present, which is either small and subglobose, or large and hemispherical, or even clavate. This feature is interesting, as proving that Greville was correct in describing and figuring "a very minute columella" in his type-specimen (referred to in Brit. Mus. Cat. p. 82).

LEPIDODERMA CARESTIANUM (Rabenh.) Rost. The changes this protean species assumes have been described by Prof. Schinz in *Die Myxomyceten der Schweiz*, p. 63, where reasons are given for regarding *L. Chailletii* Rost. and *L. granuliferum* R. E. Fries as forms of this species. We obtained about fifty plasmodiocarps of

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* Gathered near Lisbon, January, 1908, by J. C. Torrend, S.J.

L. Carestianum, close to melting snow, above Arolla, in July 1907, and these again show great variety in the character of the calcareous deposits and in the capillitium and spores. In some sporangia where lime is altogether absent they are dark brown in colour; in two the wall is covered with stellate or rod-like crystals of a *Didymium* character, such as are also present in large gatherings made by Dr. R. E. Fries in Jämtland; in the remaining sporangia the walls are clothed with the crystalline scales characteristic of *Lepidoderma*. Turning to the capillitium, we find that in about half the specimens this is fairly regular, and consists of sparingly branched purple threads, sometimes showing a few pouch-like expansions enclosing crystalline nodules of lime; in six specimens the threads are much branched, and exhibit wide membranous expansions without lime; in nineteen sporangia the capillitium is of the form characterizing the var. *granuliferum*, and consists of a dense network of purplish or hyaline threads with numerous many-rayed chambers, each enclosing one or more calcareous nodules; these remarkable forms blend into one another. The spores vary from 10 to 16 μ diam., the majority measure 14 μ.

As British representatives of this species we have two specimens of the var. *Chailletii*, both of winter growth; one was gathered on dead leaves at Failand, Somerset, in December, 1898, by Miss Agnes Fry, the other at Crediton, Devon, in February, 1907, by Mrs. Montague, who found it in abundance "developing from brownish-white plasmodium which had spread for about half a yard over some tan laid down over a flower-bed." In these specimens the inconspicuous grey or drab sporangia are sessile or shortly stalked, hemispherical or subglobose, from 0·5 to 1 mm. diam., but sometimes form long plasmodiocarps; they are clustered on a well-developed brown hypothallus, closely beset, like the sporangium-wall, with crystalline scales and nodules of lime; the columella is hemispherical or shortly clavate, and, together with the stalk, is filled with crystalline nodules; the capillitium is of abundant, sparingly-branched, purplish-brown threads, and persists for some time after the stout sporangium-wall has broken away above; the spores average 11 μ. These gatherings resemble the type of *L. Chailletii* Rost. from Hauenstein, Bohemia (leg. Opiz), but have the columella more strikingly developed; they still more closely resemble the specimen collected "on meadows after snow," near Chasseron, Switzerland, 1550 m. alt., by Charles Meylan, and described fully by Prof. Schinz (*l. c.* p. 63).

Prof. Farlow sends us a plasmodiocarp 9 mm. in length of the typical form of *L. Carestianum*, gathered by him on the leaves of *Taxus* at Chocorna, N.H., in July, 1907; as far as we know, this is the first record of the species from the Eastern States.

Lamproderma Lycopodii Raunkiaer. On *Lycopodium alpinum*, Fürstenalp, Graubunden, 1700 m. alt., leg. A. Volkart, July 6th, 1904. This specimen consists of three glossy purplish-brown plasmodiocarps, 1·5 to 2 mm. long, by 0·5 to 0·7 mm. broad; the sporangium-walls are membranous and fragile above, firm and

purplish-brown below where they form the floor; there is no trace of a columella; the capillitium is a dense network of pale purplish threads; the spores are purplish-grey, and measure 14 to 18 μ diam.; they are beautifully reticulated with raised bands, which give a border of 1·5 μ, and form a net with about four meshes across the spore. A glycerine preparation of the capillitium and spores was submitted to Prof. Raunkiaer in Copenhagen; he writes in July, 1906, "Having examined the *Lamproderma* you sent to me, and compared it with *L. Lycopodii*, it must be said to be a plasmodiocarp form of that species." Prof. Raunkiaer returned the slide, generously sending us at the same time his own preparations for comparison, but the valuable package was lost in the post, and, in spite of enquiries, has never been heard of since.

A *Lamproderma*, with spores measuring 13 μ diam., and marked with a close irregular reticulation over two-thirds of their surface and warted over the remaining third, was gathered by us above Arolla in July, 1907. The sessile globose sporangia are clustered, and show well-formed columellæ reaching nearly half their height; the capillitium is dark and rigid, of the character of var. *Carestiæ* of *L. violaceum* (Fries) Rost. Another specimen, with similar spores and capillitium but with well-developed stalks, was collected by Ch. Meylan near Ste. Croix, Switzerland, at 1100 m. alt., in March, 1907. We cannot doubt that both these specimens are *L. violaceum*, which is one of the commonest species on the Alps, and there displays great variation in the size and roughness of the spores. The imperfect reticulation on the spores of these two gatherings makes an interesting link between *L. violaceum* and *L. Lycopodii*.

Trichia contorta Rost. var. alpina R. E. Fries. Three gatherings of this very dark Alpine form have been made in Switzerland in the last two years; two from near Chasseron, at an altitude of 1200 m. and 1400 m. respectively, in June, 1906, by Ch. Meylan; the third above Arolla, at an altitude of 2700 m. in July, 1907, by G. Lister. In the last case the black subglobose sporangia were found on peaty ground on the brink of a pool of snow-water, in company with the above-mentioned sessile form of *Lamproderma violaceum*; the elaters in the Chasseron specimens have close, regular spirals; in the Arolla specimen the spirals are prominent and irregular; the spores measure from 15 to 20 μ diam. These gatherings exactly agree with the Swedish specimens collected by Dr. R. E. Fries.

UGANDA *ANONACEÆ*.

By A. G. Bagshawe, M.B., F.L.S., and E. G. Baker, F.L.S.

This paper contains a list of the *Anonaceæ* known to occur in the Uganda Protectorate. The specimens collected by Dr. Bagshaw are in the National Herbarium; those by Mr. Dawe are in Herb. Kew.

Uvaria bukobensis Engl. in Pflanzenwelt Ost.-Afr. C. 178.

Sesse Island, Victoria Nyanza, Dec. 1890, *Stuhlmann* 1215; Island of Buvuma, Victoria Nyanza, March, 1904, *Bagshawe* 639; shrub with greenish-yellow flowers and depending branches; Entebbe, April, 1905, fl. and fr., *Bagshawe* 671; Mpanga River, Toro, alt., 3500 ft., June, 1906, *Bagshawe* 1061; South Buddu, alt. 3900 ft., *Dawe* 304; Sesse Island, alt. 3900 ft., *E. Brown* 128, Hb. Kew.

There is no authentically-named material in this country, but the above agree with Engler's description and figure.

U. Welwitschii Engl. & Diels, Monogr. Afrik. *Anonaceæ*, 18 (1901).

The following description supplements that given in Journ. Linn. Soc. xxxvii. 120, which was drawn up from a poor specimen:—

Flores in ramis efoliatis pedunculati (1–1·5 cm.); sepala concava subcrassa apice subacuta usque ad dimidium vel quartam partem connata dense tomentosa (1·2–1·4 cm.) margine tenuiore; petala exteriora crassa ovata flava apice obtusa basi vix unguiculata (3 cm. longa, 2 cm. lata), interiora paullo angustiora (3 cm. longa, 1·8 cm. lata) basin versus attenuata; stamina numerosa (± 1·2 mm.), connectivo in apicem subglobosum pilosulum producto; carpella numerosa angulata, stigmate crasso basi pilis fuscis tecto (1·5–2 mm. longa).

In gully above Mulema, Ankole, April, 1903, *Bagshawe* 244, 245; Mawakota, alt. 3900 ft., *Dawe* 226: forest near mouth of Mpanga, Toro, alt. 3500 ft., Aug. and Sept. 1906, *Bagshawe* 1169 and 1202.

We have carefully compared these specimens with the type of *U. Welwitschii*. The Toro specimens differ in having the indumentum of the fruit subcinereous rather than ferrugineous.

The flower is striking—yellow with a rose-red centre.

U. angolensis Welw., which Engler and Diels suggest may be identical with this, is certainly different.

Uvaria sp. Dawe, 484.

A fine plant with well-developed fruit; flowers wanting.

Meiocarpidium ugandense, sp. n. Frutex ramulis primum ferrugineo-stellato-pubescentibus demum glabratis atropurpureo-corticatis; foliorum petiolo brevissimo ferrugineo-stellato-pubescente, lamina chartacea oblonga vel elliptica vel oblongo-ovata, apice acuta basi rotundata vel late cuneata vel rarissime subcordata, supra praeter costam impressam ferrugineo-strigosam minutis pilis stellatis et pilis sparsissime simplicibus longioribus instructa, subtus sub lente densissime squamis minutis lepidotis et pilis simplicibus albis et pilis stellatis instructa, nervis lateralibus 9–11 subtus prominulis costæ angulo acuto insidentibus prope marginem inconspicue conjunctis, nervis secundariis haud conspicuis omnibus subtus ferrugineo-pubescentibus; floribus solitariis luteis pedunculatis oppositifoliis; pedunculo ferrugineo-stellato-pubescente paullo infra medium bracteolato. bracteola

lineari-lanceolata; sepalis ± connatis concavis ovatis vel ovato-acutis extus densiuscule pilis brunneis stellatis et tomento et squamulis minutissimis subobscuris instructis; petalis subæqualibus haud crassis exterioribus subacutis quam interioribus paullo majoribus; staminibus numerosis connectivo supra loculos incrassato truncato ut apparet spiraliter dispositis; carpellis numerosis (ultra 12) quam staminibus paucioribus stellato-hirtis circa 8 ovulatis, ovulis biseriatis, stigmate subobpyramidali crassiusculo coronatis; **toro conico; fructu ignoto.**

Murchison Falls, Victoria Nile, Unyoro, alt. 2400 ft.; in flower May 7th, 1907, *Bagshawe* 1604.

Foliorum petiolus ± 2 mm., lamina 8–11·5 cm. longa, 4–4·5 lata; pedunculi 1·2–1·8 cm.; sepala ·5–1 cm.; petala exteriora 1·2–1·3 cm. longa, ·5–·6 cm. lata, interiora paullo angustiora; stamina ± 1 mm. longa; carpella ± 1·5 mm. longa.

This somewhat anomalous plant is noticeable on account of its unequal calyx and its complicated indumentum; the two rows of petals are nearly equal in length, the inner open at the base in bud, not connivent; the carpels have eight ovules in two series.

It differs from *M. lepidotum* Engl. & Diels in the more numerous carpels, and the less conspicuous lepidote character of the indumentum. In some respects it approaches *Uvaria*.

Popowia djurensis Engl. & Diels, Monogr. 49.

Sesse Island, Jan. 1891, *Stuhlmann* 1470, Hb. Berlin. We have not seen this.

Popowia littoralis, sp. n. Frutex ramis pendentibus ramulis nigro-corticatis apices versus tenuiter strigosis deorsum glabris; foliorum petiolo superne canaliculato glabro, lamina chartacea superne præter costam impressam glabra, subtus tenuiter strigosa oblonga vel lanceolata-oblongo, apice obtusa basi rotundata vel leviter subcordata, nervis lateralibus superne haud conspicuis subtus utrinque circa 10 tenuibus prope marginem conjunctis nervis secundariis haud conspicuis sub lente reticulatis; floribus solitariis lateralibus viridi-luteis; pedunculo gracili extra-axillari in parte infera bracteolato, bracteola mediocri foliacea suborbiculari cordata amplectente; calyce levissime lobato sparsissime pubescente sepalis obtusis; petalis exterioribus crassis suborbiculari-ovatis apice acutis, basi non unguiculatis subcordatis, utrinque fusco-pubescentibus concavis, interioribus subovatis basi distincte unguiculatis, longioribus quam latis dorso levissime carinatis concavis; staminibus circa 15 e basi sursum apice dilatatis, connectivo crasso; carpellis circa 15 confertis biovulatis linearibus, stigmate sessili apice truncato glabris; fructu ignoto.

Island of Buvuma, Victoria Nyanza; in flower, March, 1904, *Bagshawe*! 629; Busiro (Entebbe); depending shrub with greenish-yellow flowers, about 4 metres, *Dawe* 191.

Petiolus ± 3 mm., lamina 3·5–6 cm. longa 1·7–2·5 cm. lata, pedunculus 2·5 cm. longus, supra bracteolam 2 cm., bracteola ± 1·2 cm. longa et lata; sepala 2 mm. longa, petala exteriora 8 mm. longa, 7 mm. lata, interiora 7 mm. longa, 4·5 lata, stamina 1·4 mm. longa, carpella 1·2 mm., styli ·3–·4 mm.

Differs from *P. obovata* Engl. & Diels in the bracteoles and leaves; from *P. Gillettii* De Wildem. in the petals and size of bracteoles; and from *P. Stormsii* De Wildem. in the leaves. It resembles *P. djurensis* Schweinf., but differs in the larger bracteoles and solitary flowers.

There are at Kew specimens of two other species of *Popowia* but the material is insufficient for determination: one a subscandent or often arborescent shrub from the Kibale Forest, Toro (*Dawe* 520), closely resembles *P. Schweinfurthii* Engl. & Diels; the other, from Entebbe (*Dawe* 187; *E. Brown* 245), is perhaps allied to *Unona ferruginea* Oliv.

Hexalobus monopetalus Engl. & Diels, Mon. 56; Madi, Dec. 1862, *Speke & Grant* (Hb. Kew) and 1905, *Dawe* 883.

Xylopia Eminii Engl. Pflanzenwelt Ost-Afr. C. 179.

Sesse Island, Dec. 1890, *Stuhlmann* 1233, Hb. Berlin; Buddu, in forest belt on lake shore, *Dawe* 229; a tree—80 ft.; Entebbe, *Dawe* 118; the fruit and stipe are 3·7 cm. long; there are 2–3 seeds.

We have not seen Stuhlmann's specimen.

Artabotrys nitidus Engl. Pflanzenwelt Ost.-Afr. C. 179.

Ngusi River, Lake Albert, Dec. 1906, *Bagshawe* 1375; a climbing shrub; Wambabya River, Lake Albert, alt. 3000 ft., Jan. 1907, *Bagshawe* 1453; Wimi River, Toro, alt. 3500 ft., June, 1906, *Bagshawe* 1031; Entebbe, *Dawe* 117; Entebbe, *E. Brown* 246 (fruits).

Anona senegalensis Pers. Syn. pl. ii. 95.

Unyoro, alt. 4000 ft., *Dawe* 718; South Buddu, *Dawe* 323; in forest, 8000–9000 ft., Zeria Valley, Ruwenzori, *Scott Elliot* 7630, Hb. Kew.

Monodora myristica Dun. Mon. Anon. 80.

Busoga, *Mahon*, Hb. Kew; Victoria Nyanza region, *Dawe* 46; Toro Forest, *Dawe* 502.

M. angolensis Welw. in Trans. Linn. Soc. xxvii. 10, t. 1.

Budongo Forest, Unyoro, alt. 3500 ft., fl. Feb. 1907, *Bagshawe* 1490; a shrub or small tree. Outer petals: basal $\frac{1}{4}$ white, distal $\frac{3}{4}$ green speckled with red round edge; inner petals white with two yellow areas where lamina narrows into claw.

Monodora sp. Bugoma Forest, *Dawe* 727; fruit only, Hb. Kew; a small spreading tree with hard wood.

NOTES ON THE FLORA OF FLINTSHIRE.

By A. A. Dallman, F.C.S.

(Concluded from p. 196.)

Solanum nigrum L. Near Cwm (a single plant), *Macdonald*; a few plants near the site of the old vitriol works, Prestatyn, July, 1907; sandy ground, Point of Air.

Atropa Belladonna L. Within the remains of Hawarden Castle, and abundantly in and about Hope, *Waring*; common weed in St. Beuno's garden, 1907, *Stapleton*.

Hyoscyamus niger L. Near cottage by sandhills west of Prestatyn and about Dyserth, *Fl. B.*; two plants near Point of Air, 1907.

**Orobanche major* L. Amongst broom on side of stream near Cae Gwyn, Tremeirchion, *Herb. B.* — **O. minor* Sm. Sealand Meadows, *Payne*.

**Lathræa Squamaria* L. Banks of Terrig, near Mold (G. *R. Jebb*), Jenkinson's *Guide to North Wales*, ed. 4, 1887; in fair amount and very luxuriant about the west bank of the Alyn, near the junction with the stream forming the county boundary west of Moel Fammau; parasitic here on spruce, sycamore, hazel, and poplar, May, 1907, alt. 600 ft.

Verbascum Thapsus L. Little Rock, St. Beuno's, *Stapleton*; roadside between Mold Road and Lixwm.

Antirrhinum majus L. Limestone rock on "The Marian" common, Bryniau, Meliden, *Macdonald*.

Linaria Cymbalaria Mill. On St. Beuno's Well and walls near, *Fl. B.*; appears to be well established throughout the county and also in Denbighshire; on the bridge over the Alyn, about half-a-mile west of Hope Village; bank of lane below Trefrwd Farm. — **L. Elatine* Mill.; on hedge-banks about Ty Newydd, in Rhil, in the parish of Rhyddlan, *Bingley*; by path to Llannerch and in one of the fields beyond the road that lies west of the farm, Ty Mawr, *Fl. B.*

Limosella aquatica L. In Rhyd Marsh near Prestatyn, *Bingley*.

**Mimulus Langsdorffii* Donn. Clwyd, *Fl. B.*; Pont-y-Cambwll, on the Flint side, immediately under bridge, *Stapleton*.

Veronica Tournefortii C. C. Gmel. (*V. Buxbaumii* Ten.). Garden at St. Beuno's, *Fl. B.*; roadside behind Mostyn Hall.

Mentha piperita L. Ditch in lane near Cil-Owen, near St. Asaph.—*M. gentilis* L. (*sativa*). Swampy ground by road near Mostyn Station.—*M. longifolia* Huds. (*sylvestris*). By the brookside in a field called Maes-Madocissa, near this place (Leeswood), plentifully, *Waring*; Bumper's Lane, *Payne*.

Leonurus Cardiaca L. Hedges in valley on road to Bodfari, *Fl. B.*

Lycopus europæus L. In most northerly of three ponds in field beyond Plas-yn-Cwm, *Fl. B.*; still there, 1907, *Stapleton & A. A. D.*

Salvia Verbenaca L. About half-way down road between Dyserth and Rhuddlan, *Fl. B.*; shrubbery at St. Beuno's, *Stapleton*.

Scutellaria minor Huds. Near rifle range near Tremeirchion, *Stapleton*.

Nepeta Cataria L. Dyserth town, *Fl. B.*; a small patch by the lane side near Tan-yr-Allt, Meliden; between the road and the railway, half-a-mile or so south of St. Asaph.

Lamium amplexicaule L. Bodfari Road, *Fl. B.*—**L. hybridum* Vill. Mold, 1903, *Mason*.—*L. album* L. Caerwys Road, near inn about opposite Ysceifiog, *Fl. B.*—*L. maculatum* L. Ruined

cottages this side Ysceifiog, *Fl. B.*—*L. Galeobdolon* Crantz. High up road from Caerwys to Mold; does not appear in lower parts of valley, *Fl. B.*

Ballota nigra L. Roadside near Cwm, and common on road to Dyserth, *Fl. B.*; roadsides about Mold; Hawarden; Prestatyn.

Marrubium vulgare L. In waste ground near Ffynnon Beuno, cave, *Fl. B.*; in quantity about the old cement works, Prestatyn; hillside leading into Cwm woods, *Macdonald*.

Galeopsis angustifolia Ehrh. Inland of Gronant.

Verbena officinalis L. In quarry at Tremeirchion, *Fl. B.*; Rhydymwyn, *Payne*.

Salsola Kali L. Point of Air.

Chenopodium rubrum L. Sealand meadows, *Payne*.

Salicornia europæa L. (*herbacea*). Plentiful at Point of Air.

Atriplex hastata L. Marsh near Mostyn Station.

Obione portulacoides Moq. In quantity on marsh by Point of Air colliery.

Rumex maritimus L. On Rhyd marsh near Prestatyn, in abundance, *Bingley*.—*R. conglomeratus* Murr. Talargoch, *Fl. B.*

Polygonum Bistorta L. In the moist meadow in front of Plâs-On in the parish of Mold, *Bingley*; still there in quantity, 1907. A small patch where the road crosses the stream above Nant Figillt.—*P. aviculare* L. f. **littorale* Link. Upper Dyserth, *Fl. B.*;

**Daphne Laureola* L. In hedges in fields in front of St. Beuno's; Little Rock, above quarry, *Fl. B.*; Rhyllan, 1887, *Herb. B.*; Lower Rock Wood, *Stapleton*.

Empetrum nigrum L. On the driest parts only of the mountain called Gwern-to, *Waring*; Nerquis Mountain, close to the Denbigh border, alt. 1100–1200 ft.

Euphorbia Paralias* L. Near Point of Air and between Prestatyn and Rhyl, near ganger's cottage, *Fl. B.*; sandhills between Prestatyn and Point of Air.—*E. portlandica* L. Sandhills between Prestatyn and Point of Air, but in much smaller quantity than *E. Paralias*.—E. exigua* L. On edges of cornfields in front of St. Beuno's, *Fl. B.*; "Fields between Meliden and Nant-yr-Ogof, about two miles south of Prestatyn, July, 1885." *Herb. Brown*.

Callitriche stagnalis Scop. Plash near Point of Air, *W. & D.*

Urtica dioica L. β **angustifolia* A. Blytt. Rhydymwyn, 1903, *Mason*; woods in Mostyn Park, *W. & D.*; Nannerch.

Humulus Lupulus L. Hedge between Sandycroft and Hawarden.

Populus tremula L. "Though *Populus tremula* C. B. seems not to be very common, I believe but seldom planted, I have reason to think that we have it of spontaneous growth," *Waring*; Old Holywell Road east of Bryngwyn Mawr, *Stapleton*; side of lane by Trefrwd Farm, near Nerquis.—*P. nigra* L.; Hawarden.

**Myrica Gale* L. On a bog near the road from Mold to Northop, *Waring*.

**Carpinus Betulus* L. Several trees in the wood immediately behind Hawarden Mill; in suspicious company, several trees of *Æsculus* being close by.

**Juniperus communis* L. A number of stunted bushes on a small exposure of steep limestone scar, on the small hill (Bryniau) lying between Bishop's Wood and Dyserth Castle Hill. The station is rather difficult of access, as the face of the scar is almost perpendicular at this point.

Typha latifolia L. Mostyn, 1898, *Mason*, and 1907, *A. A. D.*; Talargoch, *Fl. B.*; marsh between the road and the railway between Mostyn and Ffynnon Groew; pond close to Rhuddlan Station.

Sparganium neglectum* Beeby. Ditches north-east of Gronant, *W. & D.*—S. minimum* Fries. Pond in large pasture-field in valley below St. Beuno's, *Fl. B.*

Potamogeton perfoliatus* L. Llyn Helyg, and just below the St. Asaph Road Bridge over the Clwyd, *Fl. B.*—*P. crispus* L. Rhydymwyn, 1903, *Mason*; ditch near Mostyn Station.—P. densus* L. In pond, Talargoch, *Fl. B.*

Ruppia rostellata Koch. In quantity, and carpeting the ditch skirting the railway between Mostyn and Ffynnon Groew, *W. & D.*

**Zannichellia palustris* L. Aqueduct, Talargoch, *Fl. B.*

**Alisma ranunculoides* L. In Rhyd Marsh, near Prestatyn, *Bingley*; pond in field in valley below St. Beuno's, *Fl. B.*—*A. Plantago* L. β **lanceolatum* Afz. With the last, *Fl. B.*

**Butomus umbellatus* L. Blacon, *Payne.*

Elodea canadensis Mich. In many still places in Elwy; just above first weir above St. Asaph, *Fl. B.*

**Orchis Morio* L. Rhydymwyn, *Payne*; fields near Llyn Helyg, *Fl. B.*—*O. pyramidalis* L. Rhydymwyn, *Payne*; Chapel Rock and Little Rock, also in little side road Bodfari side of Pont Ryfydd, *Fl. B.*; Tremeirchion, *Fl. B.*

Gymnadenia conopsea* Brown. Nant-y-Flint, *Brit. Assn. Handb.*; on the "Rock," *Fl. B.*; in boggy ground between the high road and railway, about a mile from Bodfari on the Mold side, *S. G. Cummings.*—G. albida* Rich. Valley of Allan [Alyn], *Fl. B.*

Habenaria viridis Brown. In meadows below the house of Frôn and the upper wood in the parish of Mold, *Bingley.*—*H. bifolia* Brown. On the high walk above the Allen, near Mold, and in Caerwys Wood, *Fl. B.*; cross-road from Llyn Helyg to Holywell Road, near Traveller's Rest, *Fl. B.*—*H. virescens* Druce (*H. chloroleuca* Ridl.). In road near old engine-house at lead-mine [above Rhuallt], and on the edge of the wood just beyond Bodfari Mine, *Fl. B.*

**Ophrys apifera* Huds. "Said to have been found on the railway-embankment at Dyserth," *Fl. B.*

**Spiranthes spiralis* C. Koch. Near St. Beuno's College, *Stapleton*, sp.; I refrain from giving the precise locality.

Listera ovata R. Br. St. Beuno's plantation, *Stapleton*; wood skirting Llyn Helyg.

**Neottia Nidus-avis* L. Caerwys Wood, *Fl. B.*

Helleborine latifolia Druce (*Epipactis l.* All.). "Holywell, on carboniferous limestone, at about 500 ft. altitude," *Parsons*; see *Bot. Loc. Rec. Club Rep.* 1883, p. 228; Nant-y-Flint, *Brit. Assn. Handb.*; Rhydymwyn, *Payne*; wood in Mostyn Park.—*H. longifolia* Rendle & Britten (*E. palustris* Cr.). A fair amount on marshy ground on old rifle-range off Sealand Road, below Wash Hall (within the Flint boundary), 1904, *S. G. Cummings.*

**Narcissus Pseudo-Narcissus* L. Wood near Cwm, *Mrs. Day.*

**Galanthus nivalis* L. Wood, Pant-y-Coed, Golden Grove, Newmarket, *Macdonald.* The plant *seems* quite wild hereabouts, where I am told it has grown for many years. By many botanists *Galanthus* is considered native in the adjoining county of Denbigh, so it seems reasonable to suppose that it may also prove indigenous to Flint. Should the Snowdrop be really wild here, the record is of interest as representing a considerable northward extension of its range. Wood near Cwm in company with the Daffodil, *Mrs. Day.*

Paris quadrifolia L. Sparingly in a wood in Treithin, and in one in Broncoed, both near this place, with four, five, and six leaves, *Waring*; abundant in Caerwys Wood, *Fl. B.*

**Allium oleraceum* L. Near top of crags, Coed-yr-Esgob, near Prestatyn, Aug. 1907, *Travis.*

Narthecium ossifragum Huds. Ffynnon Beuno, *Fl. B.*

Juncus maritimus Lam. Sandhills between Prestatyn and Point of Air; swamp between road and railway between Mostyn and Ffynnon Groew. — *J. bulbosus* L. (*supinus* Moench). Mold, 1903, *Mason.*

Luzula sylvatica Gaud. Woods south of Hawarden; moist woodland by the Alyn, south of Caergwrle.

**Cyperus longus* L. "Found in the marshes by the sides of the ditches near Harding [Hawarden] in Flintshire, going from thence to Chester, by Mr. Cheffield and Williams," *Lightfoot*, 1773 (see *Journ. Bot.* 1905, p. 306).

Eleocharis acicularis R. & S. Marsh, head of St. Beuno's Brook, *Fl. B.*

Scirpus maritimus L. *β compactus* Koch. Swampy ground between Mostyn and Ffynnon Groew. — **S. sylvaticus* L. Coed Mawr, near Holywell, 1903, *Herb. Mason*; in quantity by the stream in the woodland to the west of the road between Hawarden and Pentrobin, alt. circa 300 ft.

Blysmus compressus Panz. In a marsh about a mile west of Prestatyn, *Bingley.*

Carex Goodenowii Gay. The Leet; south-west of Nannerch. —*C. acutiformis* Ehrh. (*C. paludosa* Good.). Very plentiful about the ditches and stream in the damp meadow-land north-east of the railway, immediately above Mold.—*C. disticha* Huds. Mostyn, 1898, *Mason.* — *C. divulsa* Stokes. Ditches below St. Beuno's College, *Fl. B.* — *C. vulpina* L. Swamp near Mostyn Station, *W. & D.*—*C. distans* L. Plentiful in swamp near Mostyn Station, *W. & D.*—*C. pendula* Huds. Very fine and plentiful in the wood west of the Hawarden and Pentrobin Road; in the dingle between

Gwespyr and Kelston Farm. — *C. divisa* Huds. Ferry Lane, Saltney, *Payne.*

Melica uniflora Retz. Bishop's Wood, near Prestatyn.

Agrostis alba L. Mostyn, *Mason.*

**Sclerochloa maritima* Lindl. On part of the salt-marsh a mile west of Prestatyn, *Bingley*; salt-marsh near Point of Air.

**Lolium temulentum* L. "At Rhil, in the parish of Rhyddlan (Mr. Griffith)," With. *Arr.* ed. 6, ii. 239.

Festuca elatior L. and *Nardus stricta* L. Rhydymwyn, 1903, *Mason.*

Phleum pratense L. β **nodosum* L. Bumper's Lane, *Payne.*

Chara vulgaris L. β **longibracteata* Küetz. Pools on the marsh below Burton.

Pteridophyta.

Equisetum maximum Lam. Cwm Woods, *Day*; Gwespyr.

**Ophioglossum vulgatum* L. Old rifle-range, Sealand; several roots, June 4th, 1907, *S. G. Cummings.*

Lastrea montana T. Moore (*L. Oreopteris* Presl). Nant-y-bi, Pennant in *Hist. Whiteford*; by the little stream below Cae Gwyn near Tremeirchion, *Fl. B.*—*L. aristata* Rendle & Britten (*L. dilatata* Presl). Rhydymwyn, 1903, *Mason*; in the dingle between Gwespyr and Kelston Farm, *W. & D.*; by the little stream below Cae Gwyn, *Fl. B.* — **L. æmula* Brach. Abundant in the boggy part of Ffynnon Beuno Brook, *Fl. B.*

Polystichum aculeatum Schott. Common in Caerwys Wood, *Fl. B.*; Cwm Wood, *Day.*

Cystopteris fragilis Bern. Caerwys Wood; The Leet.

Asplenium Adiantum-nigrum L. Plentiful at south-west corner of "Little Rock," *Fl. B.*—*A. Trichomanes* L. Common in Caerwys Wood, *Fl. B.*; wall east end of Hawarden village.

Phyllitis Scolopendrium Newm. (*Scolopendrium vulgare* Sm.). "Little Rock," *Fl. B.*; remarkably luxuriant and plentiful, carpeting the banks of the picturesque dingle between Gwespyr and Kelston Farm, *W. & D.*

Hepaticæ.

Lunularia cruciata Dum. Wall near Mostyn Station; Dyserth; Hawarden; near Nerquis.

Marchantia polymorpha L. β **aquatica* Nees. Very fine and luxuriant in the swamp between Mostyn and Ffynnon Groew, *W. & D.* This is the first record for this plant in Wales; in Britain only previously known in South Lancashire, where it was discovered by Mr. Wheldon.

Aneura multifida L. Swamp above Bryn Ffynnon.—**A. latifrons* Lindb. On a moist clay-bank by the road near Gronant with **Pellia calycina* Tayl., *Chesher & Routledge.*

Blepharozia ciliaris L. Nant-y-bi, Pennant, *Hist. Whiteford.*

**Lepidozia reptans* L. Woods south of Hawarden.

**Lophozia ventricosa* Dum. Ffrith Mountain, *H. J. Wheldon.*

**Scapania resupinata* L. South shore of Llyn Helyg.

**Cephalozia bicuspidata* L. Ffrith Mountain, *H. J. Wheldon.*

Musci.

Sphagnum crassicladum* Warnst. Swamp on Nerquis Mountain, a few yards from the Denbigh border, and also extending into that county, alt. circa 1100 ft.—S. subsecundum* Nees (sensu lato). Lake on Hope Mountain on millstone grit. — *S. subsecundum* Nees var. **simplicissimum* Milde. Floating on the lake on Hope Mountain; this curious plant, which was identified for me by Mr. J. A. Wheldon, differs considerably from most Sphagna in appearance and structure; many of the leaves seem quite devoid of the spiral and annular thickening usually found in the leaf-cells of *Sphagnaceæ*. — *S. cuspidatum* Ehrh. Margin of lake on Hope Mountain; swampy ground on Nerquis Mountain.—**S. squarrosum* Pers. Marshy ground in a wooded excavation or old quarry to the east of the road between Hawarden and Pentrobin, alt. circa 230 ft. — **S. intermedium* Hoffm. With the last. — *S. rubellum* Russ. Ffrith Mountain, *H. J. Wheldon*; swampy ground near Bryn Ffynnon, south-west of Nannerch.—**S. inundatum* Warnst. Ffrith Mountain, *H. J. Wheldon*.—**S. recurvum* R. & W. Ffrith Mountain, *H. J. Wheldon*; marshy ground between Moel Arthur and Moel Famma.

Polytrichum nanum* Neck. Flintshire, *J. H. Lewis*.—P. urnigerum* L. Ffrith Mountain, *H. J. Wheldon*. — *P. aloides* Hedw. St. Beuno's, *Herb. B.* — *P. piliferum* Schreb. Rhuallt, February 7th, 1886, *Herb. B.*

Dicranoweisca cirrata Lindb. Afon Garth, near Mostyn, *c. frt., W. & D.*

Dicranella varia Schp. var. δ *callistoma* B. & S. Nant-y-bi, Pennant, *Hist. Whiteford.*

Grimmia apocarpa Hedw. var. γ **rivularis* W. & M. Mill-wheel at Rhydymwyn.

Rhacomitrium aciculare* Brid. On rocks and stones in the stream above Bryn Ffynnon, south-west of Nannerch, alt. 800 to 900 ft.—R. fasciculare* Brid. Rock above Bryn Ffynnon.

Tortula subulata Hedw. Foot of bank on road to Cwm, 1886, *Herb. B.*; Prestatyn; Caergwrle; Rhyl. — *T. muralis* Hedw. β *rupestris* Schultz. On grit soil near Hope village, *c. frt.*— *T. ruralis* Ehrh. St. Beuno's, 1886, *Herb. B.* — **T. marginata* Spruce. St. Beuno's garden, 1886, *Herb. B.* — **T. ruraliformis* Dixon. Very abundant on the sandhills.

**Barbula cylindrica* Schp. Near Ffrith, 1906, alt. 650 ft.— **B. revoluta* Brid. Stones on bank, St. Beuno's, 1886, *Herb. B.*— **B. unguiculata* Hedw. — *B. vinealis* Brid. Sandy ground, Point of Air, *W. & D.*

Weisia viridula Hedw. Little Rock, St. Beuno's, March 19th, 1886, *Herb. B.* — **W. verticillata* Brid. In large masses on the rocks in the dingle between Gwespyr and Kelston Farm, *W. & D.*

**Trichostomum crispulum* Bruch. Limestone rocks near Dyserth, *Travis.*

**Physcomitrium pyriforme* Brid. In abundance and fruiting plentifully about the ditches and mud-heaps bordering the same

in the damp meadow-land north-east of the railway, immediately above Mold.

Aulacommium androgynum Schwaeg. By laneside between Gronant and St. Elmo's Summer-house.

**Philonotis fontana* Brid. Frequent; Moel-y-Parc, Nerquis Mountain, Moel Arthur, and elsewhere along the Clwydian range.

Webera carnea* Schimp. Fruiting on moist clay by the road near Gronant, April, 1907, *Chesher & Routledge*.—W. albicans* Schimp. Hope Mountain.

Bryum pseudo-triquetrum* Schwaeg. Nant Figillt; Nerquis Mountain and elsewhere along the Clwydian Range.—*B. pseudo-triquetrum* Schwaeg, β **compactum* B. & S. Damp sandy ground, Point of Air.—B. alpinum* Huds. Nerquis Mountain, 1100 ft.; Moel Plas Yw.

**Mnium affine* Bland and *M. undulatum* L. Swamp between Mostyn and Ffynnon Groew, *W. & D.*

Fontinalis antipyretica L. Stream above Bryn Ffynnon.

Neckera crispa Hedw. β **falcata* Boul. Limestone rocks near Dyserth, *Travis*.—*N. crispa* Hedw. St. Beuno's Rock, 1886, *Herb. B.*; the Leet; Coed-yr-Esgob.

**Pterygophyllum lucens* Brid. Banks of clough above Bryn Ffynnon, alt. 950 ft.

**Pterogonium gracile* Swartz. St. Beuno's Rock, 1886, *Herb. B.*

Climacium dendroides W. & M. In quantity on the inland side of the sandhills between Rhyl and Point of Air.

Camptothecium lutescens B. & S. St. Beuno's, 1886, *Herb. B.*; Ffrith, 1906; Burton Marsh.—*C. sericeum* Kindb. St. Beuno's Rock, 1886, *Herb. B.*

Brachythecium albicans* B. & S. Frequent in the sandhills between Rhyl and Point of Air.—B. populeum* B. & S. Wall in Mostyn Park, *W. & D.*—**B. plumosum* B. & S. Wall near Mostyn Station, *W. & D.*

Eurhynchium Swartzii* Hobk. Near Gronant, *Chesher & Routledge*.—E. crassinervium* B. & S. Wall near Lixwm, *H. J. Wheldon*.—*E. rusciforme* Milde. In stream in dingle between Gwespyr and Kelston Farm; in stream above Bryn Ffynnon.

Plagiothecium denticulatum B. & S. γ **majus* Boul. In quantity and fruiting freely on the roots of some alders in damp ground by the stream near the road to Llandyrnog, not far from the Denbigh boundary, alt. 800 ft.—**P. pulchellum* B. & S. St. Beuno's Rock, March 19th, 1886, *Herb. B.*—**P. silvaticum* B. & S. Afon Garth, near Mostyn, *W. & D.*—*P. undulatum* B. & S. St. Beuno's, 1886, *Herb. B.*

Hypnum aduncum* Hedw. var. η *paternum* Sanio f. *gracilis* Ren. Ditch about half a mile south-west of lighthouse at Point of Air.—Var. ξ **intermedium* Schp. Marshy ground by the Pant-yr-Gof lead-mine.—H. fluitans* L. var. γ *atlanticum* Ren. In large masses on damp ground towards the summit of Nerquis Mountain, alt. circa 1100 ft.; grows here on similar ground to that on Pendle Hill in South Lancashire, where this plant was first discovered by Mr. J. A. Wheldon.—Var. δ **gracile* Boul. Lake on

Hope Mountain; among *Sphagnum* on Nerquis Mountain.—*H. exannulatum* Gümb. var. δ **falcifolium* Ren. Swamp above Bryn Ffynnon; Nerquis Mountain.—*H. uncinatum* Hedw. β *plumulosum* Schp. Nant Figillt, *Proc. Liverpool Bot. Soc.* 1908, p. 43. —*H. revolvens* Swartz. Ffrith Mountain, *H. J. Wheldon.*—**H. commutatum* Hedw. Dingle between Gwespyr and Kelston Farm, *W. & D.*; damp ground above Nant Figillt.—*H. falcatum* Brid. Ffrith Mountain, *H. J. Wheldon.*—**H. stellatum* Schreb. In the swampy ground near Mostyn Station.—*H. cupressiforme* L. var. η **tectorum* Brid. Sandhills between Rhyl and Point of Air in abundance.—*H. molluscum* Hedw. The Leet; limestone scar beyond Prestatyn.

LICHENES.

**Sphærophorus coralloides* Pers. Grit rocks on Hope Mountain.

**Cladonia cervicornis* Schaer. Sandy ground, Point of Air, *W. & D.*

Cladina sylvatica Nyl. Plentiful on the sandhills.

**Cetraria aculeata* Fr. Sandy ground, Point of Air, *W. & D.*

**Evernia furfuracea* Fr. On rocks near the lake on Hope Mountain.

Parmelia sulcata Tayl. Near Prestatyn.—*P. fuliginosa* Nyl. On trees in Mostyn Park, *W. & D.*

**Peltigera polydactyla* Hoffm. Sandhills, Point of Air, *W. & D.*

Lecanora crassa Ach. Holywell (Prof. Churchill Babington), Leighton's *Lichen Flora of Great Britain*; limestone rocks in the Leet, 1905; limestone scars behind Prestatyn.—*L. murorum* Ach. Limestone scar behind Prestatyn.—*L. sulphurea* Ach. Garden wall at Point of Air, *W. & D.*—**L. subfusca* Nyl. var. *campestris* Nyl. Wall near Mostyn Station, *W. & D.*—*L. sophodes* Ach. forma *metabolica* Ach. Rhyddlan Castle, *Leighton* (*loc. cit.*).

Placodium decipiens Arn. Rhyddlan Castle, Leighton, *Lichen Flora.*

Pertusaria amara Nyl. On trees in Mostyn Park.

Lecidea lucida Ach. On rock in Afon Garth, near Mostyn, *W. & D.*—*L. geographica* L. Garden wall at Point of Air, *W. & D.* —*L. cæruleo-nigricans* Lightf. Limestone scar behind Prestatyn. —*L. concentrica* Dav. Whitford, 1794, Hugh Davies in *Trans. Linn. Soc.* ii. 284 (1794).—*L. myriocarpa* DC. On trees in Mostyn Park.

**Verrucaria rupestris* Schrad. var. *muralis* Ach. On wall in Mostyn Park, *W. & D.*

SHORT NOTES.

PRIMULA ELATIOR Jacquin.—It may be of interest to place on record the occurrence of the Oxlip in Howe Wood, near Saffron Walden, Essex. This locality is just outside the "larger or eastern district" of the Oxlip, as charted by Mr. Miller Christy. The plant occurs only in very small quantity, and could very easily be missed by anyone. As Mr. Christy points out that in

some parts of the Oxlip area the plant has no local name, it may be worth while to mention that the keeper of the wood spoke of the plants as "primroses."—C. E. Moss.

Carex vesicaria in West Gloucestershire.—Whilst walking on May 28th over a fresh district near Iron Acton, about nine miles north of Bristol, I observed *Carex vesicaria* growing in considerable quantity by the banks of the river Frome. It formed a patch about twelve feet long, and the plants were in beautiful fruiting condition. This is a new Sedge for the Bristol coalfields, and has not been hitherto recorded for the vice-county of West Gloucestershire.—Ida M. Roper.

Monmouth Plants.—A new county record for Monmouthshire is *Ranunculus Lingua* L. Mrs. Griffith, of Machen Rectory, showed it to me on June 8th (Whit Monday). It is the form with very long and narrow leaves. The locality is far from the sea, and distinctly belongs to the hill district of the county; a small marsh in some hay meadows at a point where the river valley opens slightly. The plant is apparently slowly disappearing; the ground seems to be drying up. In Glamorganshire, not far from Rudry, I found new localities for *Polygonatum multiflorum*. *Aconitum Napellus* is far too widespread and abundant a plant in the Rumney and Ely valleys and their tributaries to be anything but a native of both v.-c 35 and v.-c. 41. *Daphne mezereum* is reported from that part of v.-c. 41: and, though the evidence is good, such a rare plant must be placed on permanent record only on the surest grounds.—H. J. Riddelsdell.

Flora of Flintshire.—Mr. Dallman, in his very interesting *Notes on the Flora of Flintshire*, excludes "the isolated portion of the county situate in Shropshire." In a new Flora of Shropshire which the Caradoc and Severn Valley Field Club hope to bring out in a year or so I have been carefully erasing records which occur for that area. If Mr. Dallman excludes it, and Shropshire rejects it, what is to be done with that poor little bit of Flint? It would have been better if Watson had included it in v.-c. 40, but as he did not, I venture to think that it should be considered as part of Flintshire for botanical purposes.—W. P. Hamilton.

NOTICES OF BOOKS.

The Structure of the Cotton Fibre in its Relation to Technical Applications. By F. H. Bowman, D.Sc. Macmillan & Co. Cloth, 8vo. Pp. xix. 470. Price 8*s.* 6*d.* net.

This is the third edition (though not so stated) of a work which appeared originally in 1881 and had passed into its second edition in 1882. It was then described by its author as "the full text, with additions, of a series of three Lectures delivered at the request of the Council of the Bradford Technical School," but he speaks of this third edition as "a *résumé* of our knowledge on the subject up to the present day." The original work was excellent,

and fulfilled a distinct purpose; it was a pioneer in a new departure, namely, accurate comprehension of the relation of physical and structural peculiarities to industrial attainments, and had the charm of being personal and original. On every page it manifested the advantages of a scientific and technical mind brought to bear on one of the most important aspects of the textile industries. It was therefore in high expectation of much benefit that we turned to the perusal of the new volume.

So much has occurred since Dr. Bowman gave the public his views on the main aspects of his special study of the cotton staple that a *résumé* was no mean undertaking. If we venture to criticise the book somewhat unfavourably, it should be borne in mind that we do so from its shortcomings in this respect, and not with regard to its practical value in conveying the opinions of a veteran expert.

In the preface the author tells us that he had hesitated for some time whether the illustrations should be photographic or graphic, but finally decided in favour of the latter. This was most unfortunate: nothing could be more bewildering and misleading than the illustrations of this "monograph." The frontispiece, for example, is artistically good, but it represents no known species of *Gossypium*. On fig. 21, repeated as fig. 24, we have a series of six sketches purporting to show the "various stages of growth of the cotton-flower from the earliest bud, 1, to 6, the fully developed square ready for unfolding, at intervals of about five days, when the sepals are just opening and showing the tops of the petals enclosed within them which form the corolla" (p. 78). In his earlier publication two barbaric sketches were given of "longitudinal and transverse sections of the cotton-pod"; and one could but smile at the confusion of ideas and terms, since obviously the author was neither botanist nor artist. But it is scarcely pardonable, after twenty-six years of "experiments and observations and sketches," to find the bracteoles once more figured and described as the calyx. So, again, on fig. 25 we have a picture that for inaccuracy would be hard to beat. The leaves are shown as opposite, and the flower-bud as terminal, which, it is needless to say, they cannot be in *Gossypium*. The fully expanded flower and second bud can have no possible connection with the twig on which they have been stuck. But we must allow the author to describe his own plate:—"On the same twig are seen two flower-buds, the lower one rapidly maturing and the upper with the petals of the corolla already protruding above the calyx and ready to expand in a few hours. Although this example was sketched from a flower of Egyptian cotton, probably *Gossypeum* peruvianum*, it may be taken as typical generally of the other varieties, although they differ slightly in the form of the petals, as some have a more irregular edge and, indeed, this occurs on the same plant; also the colours differ" (p. 83). It would seem that the names of species are regarded like the peripatetic

* This is the spelling adopted all through the book!

showman's statue, which was capable of being used in turn for each local popular hero. Dr. Bowman's illustrations and descriptions would have been pardonable in a fifteenth or sixteenth century publication, but they are entirely inadequate to-day.

Careless expression and defective observation naturally shake the faith one is prepared to place in the work of an acknowledged expert. We turn, therefore, to the passages that deal with the structure of the cotton fibre in relation to technical applications. Here the foremost consideration ought surely to be the special merits of the staples of each known species, variety, or race of the cotton-plant. On p. 67 we read, "*Gossypeum peruvianum* is indigenous to South America, as the name indicates. The flowers are yellow, like *Gossypeum barbadense*, and the pods each contain eight or ten black seeds arranged in adherent files." Here apparently our author has confused the two species named with Kidney Cotton (*G. brasiliense*), owing apparently to his having accepted Professor Parlatore (pp. 65–68) as his botanical authority. From the standpoint of species, therefore, the work before us is certainly not a *résumé* up to date, since it adopts the views of a botanist who has been superseded by at least half-a-dozen writers whose opinions are currently accepted. Our author continues: "The fibre is strong and robust, and possesses a considerable reluctance to torsion, so that it is valuable in imparting to yarn spun from it a 'loftiness' of character in the yarn which enables it to 'fill in' when made into goods, which is of great advantage in many cases where apparent substance has to be combined with lightness in weight." This gives us the experience of an expert with a special cotton. We may surmise that the cotton in question is Rough Peruvian. But after reading the book through we fail to discover the merits of any other cotton, and are forced to believe that our author, having disregarded the determinations of the species, has neglected to ascertain the special industrial merits of the various cottons of commerce. Indeed, on p. 68 he tells us that the cotton-plants of the world "may be said to present three different characters, *viz.*, herbaceous, shrub, and tree cotton, and from one or other of these the world's crop is obtained, and the differences in the various characters of the fibres present similar peculiarities from whatever sources they are derived, differing only in degree." After this we are not surprised that the chapters on the Classification of Fibres and Differences in Fibres Grown in Different Countries contain little of an expert character.

Turning over the pages to see if the graphic representations given of microscopic slides can help us, we are confronted with numerous difficulties and irregularities:—Fig. 1, we are told, represents fully ripe American cotton magnified 130 diameters; fig. 37 shows "Wild African cotton" and "Rough Peruvian," represented at 175 diameters, whereas the original sketch made from this slide (plate vi. 2nd ed.) was 300 diameters; figs. 42, 43 and 44 show unripe, half ripe and fully ripe cotton fibres magnified 200 diameters; these reproduce plate iv. of the original work, which was said to be magnified 325 diameters; fig. 45,

tranverse sections of the three stages of growth just given, magnified 200 diameters (× 450 diameters in the original work); fig. 47 shows mercerised Egyptian cotton magnified 200 diameters; fig. 48, Egyptian cotton (brown) unmercerised, also × 200; fig. 50, fibres of Sea Island cotton × 180; fig. 51 reproduces fig. 48, but it is here spoken of as a "good brown Gallini"; fig. 52 shows Egyptian cotton (white) × 200; fig. 53 gives Brazilian cotton × 200; fig. 54 reproduces fig. 1, and is said to be American cotton × 130 diameters, but we are not told which species or race; and lastly, fig. 55 is spoken of as Surat or Indian cotton, magnified 170 diameters. One would like to know why these fourteen or fifteen reproductions of microscopic slides, showing various cotton fibres, were not given uniformly on one scale, so as to allow of comparison as to thickness, both of the cell itself and of its wall; why they were not made to show a fixed length of staple so as to afford means of judging of their degree of twisting and other characteristics; why no attempt was made to represent the effects of mercerising, staining, decomposing, &c., of each particular fibre; lastly, why each and every one of the staples were not shown at fixed stages in their growth in relation to controlling climatic conditions. Surely it would have been possible to exhibit the admitted properties of accepted trade standards so as to afford data for the practical grower and the special manufacturer. On the other hand, if it be the case that all the various staples known and recognized in commerce "present similar peculiarities from whatever sources they are derived," the reproduction, graphically or photographically, of these slides can serve no good purpose.

The book is needlessly extended by the inclusion of details that are either fully understood or have no direct bearing on the structure of cotton in its relation to technical applications, and has thereby lost its original attitude of a pioneer in applied textile science. At the same time many recent discoveries are either wholly ignored or disposed of in the fewest possible words. We need but allude to Mosenthal's discovery of the existence of perforations in the cotton cell-wall (alluded to briefly on pp. 109 and 165), or to Allard's great discovery (apparently not mentioned) of what may be described as the natural spinning of the floss in the production of long Staple Upland Cottons. It seems highly probable that either environment or specific properties bring this remarkably interesting phenomenon into action. Be that as it may, there would appear every probability that incalculable possibilities are in store for the full comprehension of this new discovery. It may be premature to speculate, but it seems highly probable that to this circumstance is due the fact that the Dacca spinners of Eastern Bengal have been able to produce one of the finest of yarns from one of the most worthless of flosses. There is in fact every probability that Allard's discovery opens a perfectly new field of thought and research into the cotton staple.

The task that Dr. Bowman set himself to accomplish is undoubtedly a difficult one, and though he has rendered a useful service by the republication of the main facts of his lectures, this

book needs much revision and amplification before it can be regarded as a *résumé* of all that is known regarding the Cotton Staple.

G. W.

The Origin of a Land Flora: a Theory based upon the Facts of Alternation. By F. O. Bower, Sc.D., F.R.S., Regius Professor of Botany in the University of Glasgow. 8vo, cloth, pp. xi, 727. Price 18s. net. Macmillan.

The title of Prof. Bower's book conveys the impression of a treatise at once interesting to the expert and intelligible to the layman whose knowledge of botany is not based upon modern laboratory teaching. It suggests speculations, the slender foundations of which are forgotten in the fascination attending a search after origins; it is an attractive title which prepares the reader for an introduction to the primitive vegetable cell as it appeared on the shores of a primæval sea. The subtitle, "A Theory based upon the Facts of Alternation," comes as a shock and makes considerable demands upon the ingenuity of a reader unfamiliar with modern botanical slang, if one may use the expression. In turning to the last sentence of the concluding chapter in the hope of finding something easier, he reads:—"But whatever the modern complications may be, comparison along lines which have been pursued in this volume indicates that the sporophyte, which is the essential feature in the Flora of the Land, is referable back in its origin to post-sexual complications: *it appears to have originated as a phase interpolated between the events of chromosome-doubling and chromosome-reduction in the primitive life-cycle of plants of aquatic habit.*"

The book before us is not for the amateur, nor can it be said to furnish food easy of digestion even to the earnest student of botany. Botanists are familiar with Prof. Bower's views as expressed in a paper published in the *Annals of Botany* in 1890 on a "Biological Theory of Antithetic Alternation," and in the series of memoirs entitled "Studies in the Morphology of Spore-producing Members." His contention is that the spore-bearing generation (the sporophyte) represents a phase intercalated in the life-cycle of originally aquatic plants in response to the requirements of existence on land, and that starting from the cell (zygote) formed by the fusion of the male and female gametes this new phase has gradually been elaborated, as the result of increasing physiological division of labour, from the tissues formed from the zygote.

The researches undertaken by Prof. Bower with a view to the accumulation of evidence bearing upon the general question of the nature and significance of alternation of generations in plants have established his position as the leading authority on this branch of botany. Whatever may be the verdict of future generations of botanists—and this is the nearest approach to proof of the correctness or otherwise of his views which can be expected—there can be no difference of opinion as to the value of the investigations. We cordially agree with the author when he writes:—"But even where problems are apparently insoluble

under circumstances of present knowledge, it is a satisfaction to most minds to entertain an opinion, even if that opinion be of a theoretical nature, and be liable to future modification or ultimate disproof." It is of the greatest assistance to teachers and students to have the advantage of an author's review of his own more special researches; by focussing the evidence obtained from a variety of sources it is easier to form an opinion on the merits of the case before them. A summing up to be effective should be clear, well-arranged, and concise, with as little repetition as possible, and with no superfluous detail. It is perhaps hardly fair to regard the *Origin of a Land Flora* in the light of a summary, but to some extent it is inevitable that we should so regard it. Taking for a moment this somewhat narrow view, let us see how far the author has complied with what we venture to consider essentials in a judicial statement of evidence. The book is well-written, and with a freshness suggestive of keen enjoyment of a congenial task; the facts and arguments are lucidly stated, and the text is singularly free from mistakes; the main contention is well maintained, though at times obscured by the wealth of facts. Prof. Bower

> **" . . . hath among least things**
> **An undersense of greatest, sees the parts**
> **As parts, but with a feeling of the whole."**

But, we must add, the text consists of 727 pages! As a general exposition of a theory it lacks conciseness, and suffers from want of restraint. "To use too many circumstances ere we come to the matter is wearisome, and to use none at all is blunt": the author's thesis would have gained in force had he written with Bacon's aphorism in front of him. The reader may be compared to a traveller in a difficult country endeavouring to keep pace with a guide thoroughly familiar with his surroundings; he becomes fatigued and bewildered by the numerous cross-roads and divergent paths, and on reaching his journey's end his brain retains a blurred image of the route traversed. The allurements of paths leading in other directions occasionally assert themselves, but the traveller is carried along by the insistence of his guide with a feeling that after all he may not be following the right road. A French botanist whose enthusiasm for fossil bacteria occasionally got the better of his sense of proportion, remarked: "Partout où nous avons cherché des Bacteriacées nous en avons rencontré." It would perhaps be too much to expect even from so eminently fair a controversialist as Prof. Bower that he should always avoid the temptation which is inseparable from a fixed conviction.

A noteworthy feature of the volume is the successful treatment of evidence derived from a study of fossil types; in his recognition of the importance of the records of the rocks in all questions concerned with problems of evolution the author has shown a breadth of view which is by no means common among botanists who have not made a special study of extinct plants. It is a fact of considerable importance that Palæozoic plants cannot be said to furnish strong support to the views ably advocated by Prof.

Bower; while admitting the futility of looking for starting points of lines of evolution among the relics of past ages, it is difficult to avoid the conclusion that the morphological features which we find in the Pteridophytes of the Palæozoic era do not supply such evidence as we might reasonably expect if the history of the sporophyte has followed the course of development suggested.

It is impossible to do justice to the merits of Prof. Bower's greatest work within the limits of a single review. The result of his intensive study of a difficult problem demands grateful acknowledgment on the part of all botanists. It is easy to criticize, but we freely admit that, theoretical considerations apart, the book is a production which English Botany is proud to number among the contributions to biological science which will always occupy a permanent place in the progress of knowledge.

A word of acknowledegment is due to the publishers for the liberal supply of illustrations, and for the high standard of the volume.

A. C. Seward.

Types of Floral Mechanism. A selection of diagrams and descriptions of common flowers arranged as an introduction to the systematic study of Angiosperms. By Arthur Harry Church, M.A., D.Sc. Part I. Types i.–xii. (January to April). 4to, pp. vii, 211, with numerous full-page coloured plates and text-figures. Oxford: Clarendon Press. 1908. Price 21*s*.

In noticing this very beautiful and elaborate work, one remark seems obvious—there is nothing else like it. Originally prepared for class purposes, and limited to a hundred types, as illustrating what may be termed in popular phraseology "the Hundred Best Flowers," this collection of floral studies has been arranged for publication in the hope that it may prove useful, not only to other teachers and students, but also to all those who are interested in the study of natural history and problems of plant-life. The types have been selected as presenting features of special botanical interest, combined with the fact that they may all be readily cultivated in an ordinary garden, and are well-known or readily obtainable plants. Short notices of allied forms have been included in order that each type may appear duly orientated with regard to other organisms. With these objects in view Dr. Church has brought together a great deal of information on a limited number of, in the present case, late winter and spring flowers, and species nearly allied to them. To take an example, *Helleborus niger* (Christmas rose). A short description of the habit, habitat, and uses of the plant, with references to the genus and species, as founded by Tournefort and Linnæus, and the plant as understood by Dioscorides and Gerard, is followed by a technical description of the inflorescence and flower, and a brief account of the variations in size and number of parts of the latter. Next, the scheme of the inflorescence and, at some length, the mathematical construction of the floral diagram are discussed. Then floral development is described with the aid of some excellent figures,

attention is drawn to various special mechanisms involved in the construction of the flower, pollination is treated of at length, fruit and seed are described, and reference is made, with illustrations, to some monstrous forms. A comparison with allied species follows, mainly *H. fœtidus*, then theoretical considerations, with the summing up thus: "In its essentials, therefore, the flower of *H. niger* represents a remarkably simple floral construction, and in all probability is as near the ancestral type from which the bulk of modern angiospermous flowers have been derived as may be found." Systematic relationships are thus briefly dismissed: "From the standpoint of such primitive construction the genus *Helleborus*, with the numerous forms conventionally included in the genus (about fifteen species), is included in the still more conventional group *Ranunculaceæ*, a somewhat heterogeneous collection of about twenty-seven genera and one thousand species of mainly herbaceous types growing in the North Temperate Zone, which present somewhat similar relations in the fundamentally simple floral construction, which includes a relatively large number of free floral members (e. g. *Ranunculus*, *Pæonia*, *Clematis*, *Aquilegia*, *Aconitum*, *Delphinium*, *Nigella*)"—surely a somewhat summary treatment of a family, the study of which by Antoine Laurent de Jussieu has been regarded as the foundation of the natural system of classification and of the true appreciation of the relative value of characters.

The other types taken are *Galanthus nivalis*, *Jasminum nudiflorum*, *Crocus vernus*, *Daphne mezereum*, *Viola odorata*, *Narcissus Pseudo-Narcissus*, *Erica carnea*, *Ribes sanguineum*, *Cydonia japonica*, and *Vinca major*; these are studied on lines similar to those illustrated under *Helleborus niger*, with a strong tendency, as in that case also, to elaborate in the direction of phyllotaxy—as we might expect from Dr. Church. From this short account of his methods it is evident that Dr. Church's book will be, when complete, a valuable contribution to floral morphology, and will form an excellent introduction to a more systematic study of the genera and families of Angiosperms. The illustrations call for special reference. The full-plate coloured illustrations of the flowers in sectional elevation, three or more of which are given with each type, are the best examples of colour-printing applied to this subject that we have seen, and the full-plate black-and-white floral sections and diagrams, and the numerous text-figures illustrating development, &c., rank with the best of their kind. The text is also beautifully printed. But it is all done on the modern highly-glazed paper, the life of which is, we believe, limited to twenty years or so. While it may not be possible to get quite such good results for figures on good rag paper, it is a question whether it is wise to make so heavy a sacrifice from the point of view of durability. The price, 21*s.* per part, means presumably about eight guineas for the entire work; this is perhaps high from the student's point of view, but is by no means high on the assumption that the standard of production realized in the first part will be maintained throughout.

A. B. Rendle.

A Text-book of Botany. By Drs. Eduard Strasburger, Fritz Noll, Heinrich Schenck, and George Karsten. Third English Edition, revised with the Eighth German Edition by W. H. Lang, M.B., D.Sc. 8vo, pp. x, 746, with 779 Illustrations, in part coloured. London: Macmillan. 1908. Price 18*s*.

The Strasburger text-book of botany, being so well-known and in such general use, and the various editions, German and English, having been from time to time noticed in this Journal, it is unnecessary to give any account of the general scope of the work and the arrangement of the subject-matter. It remains only to point out the special features of the present edition, which we may regard as the most useful general text-book of botany published in English. Compared with the first English edition of 1898, the book has increased considerably in size and botanical value. The 1898 edition contained 632 pages with 594 illustrations, the 1908 edition contains 746 pages with 779 illustrations. The sections dealing with morphology, physiology, and the special botany of cryptogams have been revised and slightly enlarged; but the most important feature of the present edition is the revision and arrangement of the section dealing with the special botany of Phanerogams, which covers 219 pages as against 174 in the first English edition. This includes a useful introductory section on the transition from the Cryptogams to the Phanerogams, and a table of the classes and most important orders and families, which are now arranged according to the modifications of Eichler's system adopted by Dr. Engler in his *Syllabus*. A great many new figures have been introduced, in some cases replacing old ones, and there is an increase in the number and an improvement in the quality of the coloured figures, which, considering the price of the book, are excellent. Teachers and students of botany are under an obligation to Dr. Lang for rendering available in English this valuable text-book in its recent and improved form.

A. B. R.

BOOK-NOTES, NEWS, &c.

At the anniversary meeting of the Linnean Society on May 25 Dr. D. H. Scott, F.R.S., was elected President.

The Cambridge University Press has published a *Catalogue of the Library of Charles Darwin, now in the Botany School, Cambridge*, compiled by Mr. H. W. Rutherford, of the University Library, to which Mr. Francis Darwin, who presented the library, has contributed an interesting introduction. From this we learn that "the chief interest of the books lies in the pencil notes scribbled on their pages, or written on scraps of paper and pinned to the last page"; some of these notes are printed in the introduction. Darwin "hardly ever had a book bound, and the collection retains to a great degree its original ragged appearance."

The second part of the second volume of Prof. Sargent's *Trees and Shrubs* is mainly occupied with the genera *Cratægus* and *Viburnum*—ten new species of the former swell the already long list of these critical trees. Mr. Rehder describes thirteen Viburnums from China and Japan, two of which are new, and adds a conspectus of the species—sixty-five in number—of Eastern Asia, many now for the first time described. The other plants figured are *Magnolia Kobus* DC., and *Pterocarya Rehderiana* C. K. Schneider. The excellent plates add greatly to the value of the work.

In the *Bulletin de l'Herbier Boissier* for June Mr. F. N. Williams has a paper on "European Varieties of *Silene inflata*"—"a name for the white-bottle in all but universal use for 108 years and therefore here kept up." A parity of reasoning would suggest that the English name "Bladder Campion," which is in universal use, should not have been superseded by "White Bottle"—a book-name only employed, we think, by Withering. Mr. Williams makes six varieties—*angustifolia*, *latifolia*, *alpina*, *minor*, *pubescens*, and *marginata*—of which the second is English (Yorkshire). We find no reference to *Cucubalus angustifolius* Miller or to *C. latifolius* of the same author, so are unaware whether they represent Mr. Williams's first and second varieties; the latter name has been adopted for the species in recent British lists as being the oldest available trivial. The synonymy of the varieties is given in detail, but that of the species is omitted.

M. de Halácsy has issued a supplement to his excellent *Conspectus Floræ Græcæ* which was completed in 1904. The supplement is mainly occupied with additional localities, but some species are added, and the genus *Taraxacum* is arranged (with descriptions) in accordance with Handel-Mazzetti's monograph noticed in our last issue.

On July 1st, 1858, a special meeting of the Linnean Society was summoned for the election of a member of Council in place of Robert Brown, who had died during the previous month, and George Bentham was elected in his place as member of Council and Vice-President. A fitting resolution was moved by Sir Charles Lyell and seconded by Mr. Bennett. This having been passed unanimously, a letter was read from Sir C. Lyell and Dr. J. D. Hooker, addressed to the Secretary, introducing papers on the laws which affect the production of Varieties, Races, and Species, by Charles Darwin and A. R. Wallace. On July 1st, 1908, the fiftieth anniversary of this meeting will be commemorated by a Darwin-Wallace Celebration, when the Society will hold special meetings. At the afternoon meeting, which will be held in the meeting room of the Institution of Civil Engineers, the Darwin-Wallace Medal will be given to Dr. Alfred Russel Wallace, Sir Joseph Hooker, Prof. Ernst Haeckel, and four other eminent biologists, and addresses will be received from various corporate bodies. After a dinner, at which the President of Council will entertain the medallists and foreign guests, a reception will be held in the rooms of the Society at Burlington House.

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Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

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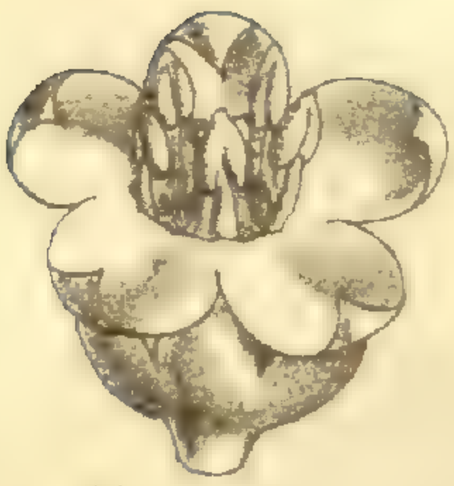

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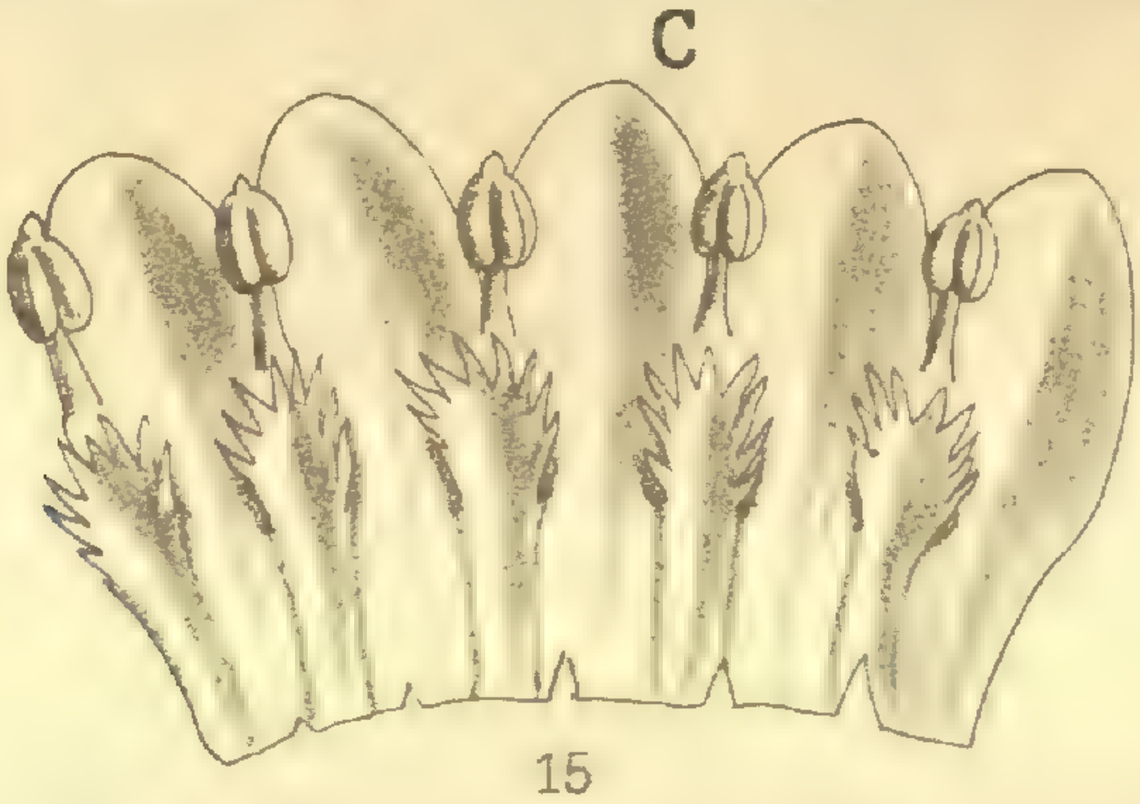

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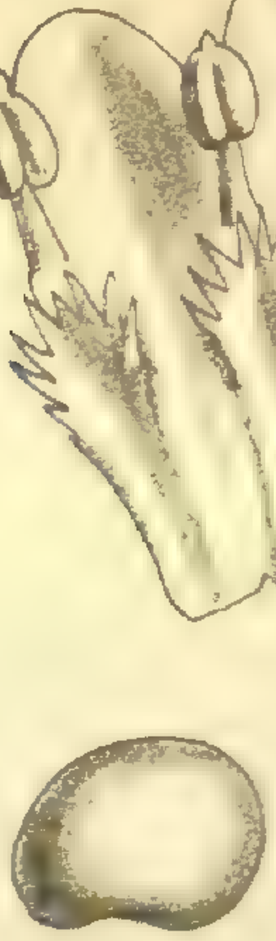

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M. Smith del.
J. N. Fitch lith.

West, Newman imp.

A. Cuscuta suaveolens *Seringe.*
B. C. Tinei *Insenga.* C. C. Gronovii *Willd.*

THE HISTORY OF THREE CASUAL DODDERS.

By W. Botting Hemsley, F.R.S., F.L.S.

(Plate 493.)

A. Cuscuta suaveolens Seringe (syn. *C. hassiaca* Pfeiffer).

The first record of the occurrence of this plant in the British Islands is by E. G. Varenne, in the *Phytologist*, 1851, iv. 382. It was taken from a field of lucerne at Witham, in Essex, and there is an authenticated specimen in the Watson Herbarium at Kew.* In 1867 Mr. H. E. Fox found the same species growing on lucerne in the allotment grounds near the station at Cambridge, and there are specimens of his collecting in the Watson Herbarium and at the British Museum.

The next record, in point of date, is in this Journal for 1868, p. 348. It is to the effect that the Rev. J. F. Crouch had observed the lucerne dodder in abundance near Pembridge, in Herefordshire, and that Dr. H. G. Bull had made a drawing of the plant. This, together with a description, appears in the *Transactions of the Woolhope Naturalists' Field Club* for 1868, p. 122. Purchas & Ley (Flora Heref. 1889, 206) state that this dodder had not since been found in the county.

In the *Gardeners' Chronicle* for 1869, p. 1038, there is an editorial statement that a correspondent had forwarded specimens of *Cuscuta hassiaca*, collected at Adwell, Oxfordshire, and reference is made to "its clear orange stems and abundant, pure white, exquisitely scented flowers."

In this Journal for 1870 (p. 355) is a record by F. E. Kitchener that this dodder "had appeared last year, and again this year, in a field of lucerne near Rugby, belonging to Mr. E. Edwards." This was followed in 1871, p. 17, by a note from W. A. Leighton that it had been found that summer by Mr. John Dovaston at Wigmarsh, near Westfelton, Shropshire. This is the last indexed record of *Cuscuta hassiaca* in the *Journal of Botany*, and the only mention of it found in the Reports of the Botanical Record Club, and of the Botanical Exchange Club, is in a list of desiderata in the latter for 1878. Babington, who was specially interested in the genus *Cuscuta*, records *C. hassiaca* from the Essex locality in the fourth edition of his *Manual* (1856), and the record is repeated in successive editions, even to the ninth (posthumous) edition, under the same name, without synonyms and without any further localities.

After an interval of nearly thirty years Mr. C. E. Salmon found *C. suaveolens*, as we will henceforth call it, in a waste field at the top of Colley Hill, Reigate, Surrey, parasitic on *Prunella vulgaris*, *Cnicus arvensis*, *Ranunculus repens*, &c., and it is recorded in the

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* Gibson (*Flora of Essex*, 1862, p. 208) records this dodder from Witham, Rawreth, and Hull Bridge: all on the authority of E. G. Varenne.

Proceedings of the Holmesdale Natural History Club for 1899–1901, p. 40.

Dr. A. B. Rendle kindly gave me a few flowers from a specimen preserved in the British Museum, and Mr. Salmon subsequently communicated a specimen, which enabled me to confirm his determination.

In August, 1906, Mr. R. Hedger Wallace, Lecturer on Agriculture for the Glamorgan County Council, sent specimens of a *Cuscuta* to Kew for determination, and it was named *C. suaveolens* Seringe, but on further examination I find that it is *C. Tinei* Insenga (*C. breviflora* Visiani), dealt with below.

So far the history of *Cuscuta suaveolens* in England; but it appeared on the Continent before it was detected here, causing a considerable stir, and receiving a long string of names. Seringe described it under this name in the Ann. Sciences Phys. et Nat. d'Agriculture de Lyon, 1840, iii. 519. This publication is not accessible at the moment, but the *Botanische Zeitung*, i. 146 (1843), states that at an exhibition of fruit and flowers at Lyons, in 1840, Seringe exhibited a new dodder, *Cuscuta suaveolens*, which was introduced from Chili with seed of lucerne bearing the commercial name of "alfalfa"; this differed from the other species of *Cuscuta* indigenous near Lyons in having capitate stigmas, and the plant had a most agreeable fragrance, both when fresh and dried.

In ignorance of this, Pfeiffer described (Bot. Zeit. 1843, 705) the same species as *C. hassiaca*, and laid particular stress on its having stalked flowers and capitate stigmas, "differing in these characters from all previously described German species." He discovered this "beautiful plant" in the autumn of 1843, growing on a variety of native plants, in the neighbourhood of Cassel. The *Botanische Zeitung* for the following year, 1844, contains notes on the appearance of this dodder in various parts of Germany, and on its affinities, by Hugo Mohl, G. Engelmann, A. Braun, and W. Sonder. Previously Choisy (Mém. Soc. d'Hist. Nat. de Genève, ix. 180) (communicated to the Society, Jan. 21st, 1841) had published the plant as *C. corymbosa* Ruiz & Pavon var. *β pauciflora* Choisy, floribus paucioribus: "Apud Genevam, in prato loci dicti Queue d'Arve, rep. cl. Reuter, missam cum seminibus *Medicaginis sativæ* e Pedemonte extractis et quæ alias Americanas plantas quoque continebant. Jucunde odora." The same author, in De Candolle's *Prodromus*, ix. 456 (1845), under *C. corymbosa*, adds: "Huic forsan referenda est *C. hassiaca* Pfeiff." This was discussed and disputed by Engelmann and Sonder, and the former eventually described it (Trans. Acad. Science St. Louis, i. 97, 1859) as *C. racemosa* Mart. var. *chiliana* Engelm.

There is no doubt that *C. suaveolens* is not a variety of *C. corymbosa* Ruiz & Pavon, and the question arises whether it is correctly placed as a variety of *C. racemosa* Mart. Progel (Fl. Bras. vii. 383, 1871) follows Engelmann, but he adds: "Verisimiliter species propria." C. Gay (Fl. Chil. iv. 448, 1849) accepts

it as a valid species without question or comment, and states that it is very common in Chili. Other authors refer it either to *C. corymbosa* or *C. racemosa* without any critical comparison.

Without examining a larger number of specimens it would be presumptive to judge between these authors; yet it seems more convenient to treat it as an independent species. In this connection it may be mentioned that the corolline scales are easily overlooked in dried specimens. Indeed, one might go farther and say that they are difficult to find; hence the statement that they are sometimes absent from the flowers of *C. europæa* cannot be accepted without doubts.

It would occupy too much space to enter into particulars of the other names proposed for *C. suaveolens*; it may be useful, however, to give the full synonymy, especially as this species appears, even in recent Floras, under different names and without corresponding synonyms.

Synonymy.

Cuscuta suaveolens in Seringe Ann. Sc. Phys. et Nat. d'Agric. et d'Industr. de Lyon, 1840, iii. 519; Schl. in Bot. Zeit. 1845, iii. 644; C. Gay Hist. Chile, Bot. 1849, iv. 448; Nym. Consp. Fl. Europ. 1878, 508.

C. corymbosa Choisy (non Ruiz et Pav.) in Mém. Soc. d'Hist. Nat. de Genève, 1841, ix. 180; Engelm. in Bot. Zeit. 1844, ii. 553; Sonder, *l. c.* 677; Coste Flore de la France, 1903, ii. 574, with a figure.

C. hassiaca Pfeiffer in Bot. Zeit. 1843, i. 705; Mohl in Bot. Zeit. 1844, ii. 3; Engelm. *l. c.* 553; Sonder, *l. c.* 676; Bab. Man. Brit. Bot. ed. 4, 1856; ed. 9, 1904, 291; Hook. & Arn. Brit. Fl. ed. 7, 1855, 281; Purchas & Ley, Fl. Heref. 1889, 206.

C. corymbosa β pauciflora Choisy in DC. Prodr. 1845, ix. 456.

Engelmannia migrans Pfeiffer in Bot. Zeit. 1845, iii. 673.

C. diaphana Wenderoth Fl. Hass. 1846, 364.

E. suaveolens Pfeiffer in Bot. Zeit. 1846, iv. 21, t. 1.

Cuscutina suaveolens Pfeiffer in Bot. Zeit. 1846, iv. 492.

Pfeiffera suaveolens Buchinger in Ann. Sc. Nat. série 3, 1846, v. 88.

Cassutha suaveolens Des Moul. Etud. Org. Cusc. 1853, 66.

Grammica suaveolens Des Moul. in Bull. Soc. Bot. Fr. 1854, i. 298; Parl. Fl. Ital. 1887, vi. 827.

Cuscuta racemosa Mart. var. *chiliana* Engelm. in Trans. Acad. Sc. St. Louis, 1859, i. 505; Coulter's Bot. Gazette, 1877, ii. 69, 80; Collected Works, 97, 107; Progel in Fl. Bras. 1871, vii. 384; S. Wats. Bot. Calif. 1880, ii. 471; Cheesem. Man. New Zeal. Flora, 1906, 479, 1081.

C. chilensis Bert. in sched. ex Engelm. in Trans. Acad. Sc. St. Louis, 1859, i. 505, non Ker in Bot. Reg. 1821, vii. t. 603.

C. racemosa Brand in Koch, Syn. Deutsch. Flora, ed. 3, 1902, ii. 1981, vix Mart.

Cuscuta suaveolens is still only a casual in Europe. Even on the Continent, where it appeared simultaneously in many distant

localities between sixty and seventy years ago, and in some instances was very destructive to crops of lucerne and clover, it is apparently nowhere permanent. This is not because it will not grow on a variety of common native plants. Schlechtendal enumerates, in the place cited above, more than a dozen different plants, belonging to nearly as many families, on which it had been observed. *Bromus mollis* and cereals are among the hosts named. So far as we know, Mr. C. E. Salmon's discovery of *C. suaveolens* at Reigate in 1900 is the only recent record for this country. He found it in a waste field that may have been under cultivation previously, though not, he thinks, the year before. But it disappeared after the season of 1900, and from the observations of various botanists it disappears because it is not hardy. Mohl states that the frosts of the middle of October speedily destroyed the plant in the Duchy of Nassau, and it is elsewhere noted that it does not seed freely in Europe. *C. suaveolens* has also been found in New Zealand, and it established itself in some parts of California upwards of thirty years ago.

B. Cuscuta Tinei Insenga (syn. *C. breviflora* Visiani).

I have already mentioned that Mr. Hedger Wallace sent a specimen of a dodder to Kew in 1906, which was then named *C. suaveolens*, but which I now believe to be *C. Tinei* of Insenga. It was from the experimental clover plots at St. Fagan's, Cardiff, raised from Styrian and Bohemian seed; and in a report on the various experiments carried out at St. Fagan's in 1906 Mr. Wallace states (p. 4) that it had been suggested to him that the *Cuscuta* in question was the Chilian dodder, *C. racemosa* (*C. suaveolens*). The latter name, supplied by Kew, is reproduced, p. 5, in the unrecognizable form of "*Marcobus*."

Cuscuta Tinei was the second species with capitate stigmas found in Europe, and there is a strong presumption that it may also be of American origin. Indeed, Engelmann reduces it to *C. obtusiflora* H. B. K. Nov. Gen. iii. 122, 1818, which was described from specimens collected in the Andes of Peru. But he goes much further, and reduces to it *C. australis* R. Br. (a name by-the-by nearly ten years older) and several other proposed species, giving the species, as thus extended, a world-wide range. Coste, in his recent *Flore de la France*, ii. 574, 1903, with a figure, retains *C. breviflora* Vis. (*C. Tinei*) as an independent species, a course which will be followed here. As thus limited, the synonymy is still considerable, though Coste cites only *C. bidentis* Berthiot and *Grammica bidentis* Royer.

Synonymy.

Cuscuta Tinei Insenga in Tineo Pl. Rar. Sic. 1846, 14.
C. breviflora Visiani Fl. Dalm. 1847, ii. 231; Nym. Consp. Fl. Eur. 508.
C. aurantiaca Requien; Bertol. Fl. Ital. 1847, vii. 623.
C. Cesatiana Bertol. Fl. Ital. 1847, vii. 623; Boiss. Fl. Or. 1879, iv. 121; Nym. Consp. Fl. Eur. 508 (subspecies).

C. polygonorum De Notaris Ind. Sem. Hort. Bot. Genuensis, 1849, 22; Linnæa, 1851, xxiv. 199: non Engelm.
C. chrysocoma Welw.; Des Moul. Études Org. Cusc. 1853, 71.
Cassutha chrysocoma Des Moul. Études Org. Cusc. 1853, 71.
Cuscuta Rogovitschiana Trautv. in Bull. Phys. Math. Acad. Petersb. 1855, xiii. 376; Boiss. Fl. Or. 1879, iv. 121; Nym. Consp. Fl. Eur. 508 (subspecies).
C. obtusiflora H. B. K. *fide* Engelm. ex Reichb. Ic. Fl. Germ. 1858, xviii. 85, t. 1344, f. 6–9.
C. obtusiflora var. *breviflora* Engelm. in Trans. Acad. St. Louis, 1859, i. 493; Collected Works, 91.
C. obtusiflora var. *Cesatiana* Engelm. in Trans. Acad. St. Louis, 1859, i. 493; Collected Works, 92.
Grammica chrysocoma Des Moul. in Billotia, 1864, i. 16.
Cuscuta bidentis Berthiot in Billotia, 1864, i. 15.
Grammica obtusiflora Des Moul. in Billotia, 1864, 15.
G. Ragovitschiana Janka, 1865, in schedulis in herbariis nonnullis.
Cuscuta atheniensis Boiss. et Orph. MSS. 1878, in herbariis nonnullis.

The fact that *C. Tinei* (*C. breviflora*) was described from garden specimens favours the view that this species also is only a colonist or casual in Europe. Insenga's record is: "In hortis; parasitica *Pelargonii tristis* et *Ocymi Basilici*. Ortaggi di Aci-Reale." Like *C. suaveolens*, it grows on a great variety of plants, but I have seen neither specimens nor records of it on either lucerne or clover, except the specimen sent by Mr. Wallace.

In connection with this species, I may mention that about the year 1867 the late Dr. F. Welwitsch gave me some seed under the name of *C. chrysocoma*, and my father cultivated it on single plants of an *Ocimum* in pots. We called it "golden-thread,' and it sold very well in Brighton for two or three seasons.

C. Cuscuta Gronovii Willd.

This is one of the commonest North American species, and it is now fully established on the banks of the rivers Rhine, Elbe Oder, and Weichsel, parasitic on *Aster salicifolius* and *S. Novi-Belgii*; both also colonists from North America. It has also been found on willows in Germany, and in its native country it preys on a variety of herbs and low shrubs. According to Engelmann this species was cultivated in several botanic gardens in Germany as long ago as 1859, but it was apparently not found wild in that country till 1893, and it was at first confused with *C. Cesatiana* (*C. Tinei*). I am not aware that it has been found wild in this country, but it has been cultivated for several years in the herbaceous ground at Kew, under the name of *C. glomerata*, received with the seed from a Continental garden. The true *C. glomerata* Choisy (*Lepidanche glomerata* Engelm.) is, however, as Engelmann remarks, the most striking and distinct species of the genus. Engelmann states that his *C. vulgivaga* is typical

C. Gronovii of Willdenow, and Graebner states that the wild specimens collected in Germany agree exactly with the type.

Synonymy.

Cuscuta Gronovii Willd. reliq. in Roem. et Schult. Syst. Veg. 1820, vi. 205; Choisy in DC. Prodr. ix. 1845, 459; Engelm. in Trans. Acad. Sc. St. Louis, 1859, i. 508; S. Wats. & Coult. in Agr. Man. Bot. N. U. States, ed. 6, 1890, 372; Aschers. & Graebn. Fl. Nordostdeutschen Flachlandes, 1898, 569; Graebn. in Notizblatt K. Bot. Gart. Berlin, 1899, ii. 276; Britton & Brown, Illustr. Fl. N. U. S. 1898, iii. 30, f. 2963; Ascherson in Verhandl. Bot. Ver. Brandenb. 1900, xli. 231; Brand in Koch Syn. Deutsch. Flora, ed. 3, 1902, ii. 1981.

Cuscuta caule aphyllo volubili repente, Gronovius Fl. Virg. ed. 1, 1739, 18.

C. americana L. Sp. Pl. ed. 1, 1753, 124, et auct. plur. pro parte.

Cuscuta floribus pedunculatis, Gronovius Fl. Virg. ed. 2, 1762, 22.

C. umbrosa Beyr.; Hook. Fl. Bor. Am. 1838. ii. 78, *fide* Engelm.

C. vulgivaga Engelm. in Sillim. Am. Journ. Sc. 1842, xliii. 338, t. 6, f. 12–16, et in Hook. Lond. Journ. Bot. 1843, ii. 192, t. 3, f. 3.

C. Saururi Engelm. in Sillim. Am. Journ. Sc. 1842, xliii. 339, t. 6, f. 17–21, et in Hook. Lond. Journ. Bot. 1843, ii. t. 3, f. 4.

C. vulgivaga var. *β glomerata* Engelm. in Sillim. Am. Journ. Sc. 1842, xliii. 338, *fide* A. Braun in Bot. Zeit. 1846, iv. 278.

C. bonariensis A. Braun in Bot. Zeit. 1846, iv. 278; Herb. Carlsr., Engelm. in Trans. Acad. Sc. St. Louis, 1859, i. 508.

C. chilensis Herb. Frib., non Ker, Engelm. in Trans. Acad. Sc. St. Louis, 1859, i. 508.

C. Gronovii var. *calyptrata* Engelm. in Trans. Acad. Sc. St. Louis, 1859, i. 508.

C. polyantha Shuttlew. ex Engelm. in Trans. Acad. Sc. St. Louis, 1859, i. 508.

C. Cesatiana Haussk. in Irmischia, 1882, 32, non Bertol.

C. glomerata Hort. nonnul. 1907, non Choisy, qua est species omnino diversa.

From the copious synonymy of these three dodders it is evident that authors have held very divergent views of the limits of species in the genus *Cuscuta*, and there is no doubt that they are very difficult of discrimination from dried specimens. With regard to the three under review, I do not profess to have examined critically the numerous specimens at Kew and in the British Museum bearing these names. It is indeed probable that some of them are incorrectly named; but anyone interested in comparing the figures in Plate 493 will at once see that these three are easily distinguished from each other. To what extent the flowers vary in the same species can only be ascertained by the examination of a large number of fresh specimens, and I hope to have an opportunity of doing this in some species during the pre-

sent season. I should be greatly obliged to readers of the *Journal of Botany* for fresh material of any species except the common *C. epithymum*.

With regard to species, Engelmann's conception was a very broad one. Under *C. obtusiflora* H. B. K., including *C. Tinei*, he defines seven varieties, respectively from South America, West Indies and Southern United States, India, Australia and China, South of Europe, South of Europe and Central Asia, and Africa; thus nearly covering the whole area of the genus.

Of *C. Gronovii* Willd. Engelmann describes four varieties, one of which he suggests may be a "distinct species"; but they are all confined to North America.

Of *C. racemosa* Mart. he has five varieties, including *C. suaveolens*; all South American.

With regard to the characters on which authors have relied to distinguish species, I may point out that the length of the stamens varies according to the age of the flower, and the styles, though frequently of unequal length, are not constantly so in any species that I have examined. Further, I am not sure that the lobes of the corolla are permanently inflexed in any species.

Description of Plate 493.

A. *Cuscuta suaveolens* Seringe.—1. A half-expanded flower attached to axis, × 6. 2. A fully-expanded flower, × 6. 3. Corolla laid open, showing attached stamens and scales, × 8. 4. A detached scale, × 10. 5. Pistil, × 6.

B. *C. Tinei* Insenga.—6. Flower-buds attached, showing the relatively long pedicels, × 6. 7. A young flower spread out, showing the inflexed corolla-lobes, × 8. 8. Corolla of the same laid open, showing the stamens and scales, × 10. 9. A scale from the same, × 20. 10. Pistil, × 10. 11. A fully-developed flower, × 6. 12. Corolla, stamens, and scales of the same, the corolla-lobes straightened out, × 8.

C. *C. Gronovii* Willd.—13. A fully-developed flower, × 6. 14. Calyx and nearly ripe fruit, × 6. 15. Corolla laid open, showing stamens and scales, × 6. 16. A scale, × 10. 17. A seed, × 8.

NOTES ON *POTAMOGETON*.

By Arthur Bennett, F.L.S.

(Continued from p. 163.)

One of the results of the recent monograph of *Potamogeton* by Dr. Graebner (*Das Pflanzenreich*, Heft. 31 (1907)) is to show how necessary it is that correlation of varieties over wide areas should be made. To take the species of one small country and split them up into varieties is little more than applying the same process to individuals.

Out of the five hundred and sixty varieties, subvarieties, and forms that have been published under *Potamogeton*, only about three-fifths are taken up in this latest work on the genus, leaving about two hundred unnoticed, while fifty-six new ones are given. This simply adds to the synonymy, and leaves future workers to dispose

of the undetermined but named forms. In one county in England (Cambridge) I venture to say that in a ditch my friend Mr. Fryer and I could find some twenty so-called variations in *P. angustifolius* Bercht. & Presl (*Zizii*). I have thirty specimens gathered from that same ditch with the idea of showing such variation. It may safely be asserted that seven-tenths of these would revert back to type in a year or so's cultivation. They are of great value as a means of testing inter-variation in other countries, but they are the variation of varieties, not of species. On the other hand, I believe, as Sir J. D. Hooker observes in the preface to the third edition of the *Students' Flora*, that the plants may assume one facies in one county, and another in another. This is endemic variation, and of great interest from the evolution point of view. Such a variable species as *P. alpinus* Balb. is split up into sections by the presence (or absence) of floating leaves. This of course is the result of herbarium dividing, not of study in the field; and it is awkward for such divisions that the same plant one year has floating leaves and not the next, the reason being that the backwaters are "dydled" or cleared out now and again, and then the *alpinus* is not able to reach the water-surface, and hence is submerged.

If other countries come to be investigated as closely as some parts of Europe have been, and we allow that the genus occurs in about one-half of the world, in another fifty years we may have (allowing the same ratio of fifty-six varieties to each country) the large number of five thousand six hundred varieties in the genus!

Messrs. Ascherson & Graebner's work should be taken by future workers as a basis, testing the species (especially those named in later years) and the variations by extensive comparisons of specimens from all parts of the world. It will probably be found there is much to eliminate as well as to elucidate in the genus. Cultivation will do much to help on the work, but in this some care is needed. Loose labels are absolutely useless; the names should be burnt in on the tubs, &c., used. I have had cultivated specimens sent me from a student of the genus under names that certainly were never given to them by the sender.

Potamogeton Faxoni Morong. Dr. Graebner (*Das Pflanzenreich*, 75) throws no further light on this perplexing plant. Mr. Faxon's specimens gathered on Aug. 11th and 19th, 1882, "Little Otter Creek," U.S.A., must retain Dr. Morong's name, and I believe are *P. americanus* (*lonchites*) Cham. × *pensylvanicus* Cham. But the first specimens sent me by Dr. Morong from "Lake Champlain, Aug. 18th, 1882, C. E. Faxon," are certainly another plant, and are, I believe, *P. alpinus* × *pensylvanicus*. The submerged leaves might well pass for *alpinus*, the peduncles and spikes are a combination of the two, and the floating leaves are nearly those of *pensylvanicus*. Thus following a custom disapproved of by many botanists, I propose to call it × P. Champlainii, thus associating it with its place of growth, and with an American discoverer, Samuel Champlain de Brouage. In neither plant is any fruit formed; some of the flowers of *Faxoni* are

open, but there is not the slightest indication that any of the stigmas are fertilized.

P. alpinus, *P. pensylvanicus*, and *P. americanus* all grow together in Lake Champlain, whence I have specimens from Mr. Faxon.

× P. CURVATUS mihi = *P. angustifolius* Bercht. & Presl. × *P. lucens* L. 1. Bar Lake, Manistee, Mich., U.S.A.; 2. Dutcher's Bridge, Housatanie River, Conn., U.S.A.; Dr. Robbins ex Morong. These puzzling specimens were named *P. gramineus?* by Dr. Robbins; Dr. Morong suggested a form of *lucens*, and I a form of *Zizii*. After carefully examining all the flower-spikes I cannot find a single example fertilized. The leaves partake of the characters of *angustifolius* and *lucens*; most are curved, blackish green; many shining, small (2·5 cm. × 2 cm.), oval-lanceolate. Study *in situ* is the only way out of the difficulty.

P. OAKESIANUS Robbins. For this Dr. Graebner (p. 45) substitutes the name *P. Purshii* Tuckerm. in Amer. Journ. Sc. (1848), 228, observing, "non nomen solum; cum diag.!" Certainly, if this applied to *Oakesianus*, the description is ample enough, though subsidiary to another species (i.e. *P. Claytonii* Tuckerm.), but there are difficulties in the way. Pursh (Fl. Am. Sept. ii. 120 (1814)) has a species which he called *heterophyllus*. This, Tuckerman observes, "which is included in that part of Pursh's herbarium in my possession, is a plant resembling *P. Claytonii*, but much smaller and more delicate throughout, explaining thus the citation in the *Flora* of *P. hybridus* Michx. as a synonym of so different a species as the *heterophyllus* of authors." He then gives a description, and says that Pursh recorded it as found in slow-flowing waters of Virginia and Carolina. His ticket, on which *P. hybridus* seems to have been written first and *P. heterophyllus* afterwards added, names as a station "Walker's meadows." The *hybridus* of Barton's Comp. Flor. Phil. i. 96 is probably the same plant.

Mr. Fernald, of the Gray Herbarium, writes to me:—"We have nothing to show positively what Tuckerman referred to. Some of his plants are here, but we have nothing to show for *P. Purshii*. I have been through the genus with great care, and find only one plant for Virginia which suggests Tuckerman's description. This is an extremely attenuated *P. epihydum* (*P. Claytonii*), and we have three specimens of it from Virginia and closely adjacent States, which suggest that Tuckerman may have been quite right in associating Pursh's plant with *P. Claytonii*. I cannot believe that his plant was *P. Oakesianus*, for that is a well-marked species which is quite unknown from Virginia and Carolina." It is on record for Massachusetts!, New York!, New Jersey, New Hampshire, Maine, Pennsylvania, Oregon!, and perhaps Nebraska. Among numerous specimens of *P. Claytonii* I possess there is one that might fairly be held to suggest Tuckerman's description. I have it from Carolina (Rugel), and it is in the Vienna herbarium from Virginia, but it does not seem to reach Florida, though it occurs in Georgia (Glasgow herbarium!).

On the whole the evidence seems to point to the retention of Robbins's name, as Tuckerman's description does not fit that plant, but would do for an attenuate specimen of *Claytonii*, such as var. *portoricensis* Graebn. Mr. Fernald tells me that Tuckerman's herbarium was divided into three parts. One is at Upsala, Sweden; one at Cambridge, U.S.A.; the third has not yet been traced.

P. SPIRILLUS Tuckerman. With reference to my remarks in this Journal (1893, 295) it may be well, as an additional argument in favour of using the name *P. dimorphum* Rafinesque, to refer to a specimen of "*P. diversifolius* Barton, Fl. Phil.; ponds on Long Island," in herb. Schreber at Munich. This is certainly *spirillus* Tuckerm., not *hybridus* Michx. In 1890 I followed American authors in referring *diversifolius* Barton to *hybridus*, but I had not then seen Barton's *Flora of North America*, iii. t. 84 (1823).

P. PUSILLUS L. n. subsp. ARGENTINUS. Differs from all known forms of *pusillus* in the subrotund heads of fruit, with the style central and the keels almost obsolete. The fruit closely resembles that of *P. strictifolius* Ar. Benn. of North America. Its nearest ally seems to be var. *africanus* Ar. Benn. = *P. panormitanus* Biv. var. *austriacus* Hagström.

Hab. Alta Gracia, Prov. Cordoba, Argentine Republic, April, 1897, leg. Dr. T. Stuckert.

× P. CONCILIUS mihi. *P. pensylvanicus* × *heterophyllus* Schreb. (*P. Nuttalii* × *gramineus*). In this the supposed parent *pensylvanicus* predominates. The fleshy leaves are very different from those of typical *pensylvanicus*, and, combined with the spikes and leaf-nervation, make me regard this as a hybrid. No fruit is found on the spikes, and the pollen of the half-opened flowers is bad.

P. AMERICANUS × P. PENSYLVANICUS. Dr. Hagström has found among some specimens I sent him one which he refers to the above hybrid. His calling my attention to this caused me to examine carefully my large series of *americanus*. I believe two specimens gathered in New York and East Massachusetts by the late Dr. Morong belong here.

× P. RUGELII = *P. americanus* × *lucens*. Specimens gathered by Rugel in 1849 in Florida, U.S.A. (ex herb. Brit. Mus.), and named *lonchites* by me in 1901, will, I now believe, prove to be the above hybrid. Other specimens from St. Mark's, Florida, 613, Rugel, are probably the same.

P. NATANS L. f. LINEARIS (Syme, sub *polygonifolius*). Killarney, Ireland (Barrington, 1874). Dr. Hagström refers to this as a hybrid—"a very beautiful Irish one"; = *P. natans* L. × *polygonifolius* = *P. gessnacensis* Fischer in Mitt. Bayr. Bot. Ges. München. xxxvii. (1905), 472. He also thinks the plant from "Long Range, 1888, R. W. Scully," may be the same.

P. NITENS Web. var. PRÆLONGIFOLIUS Tis. Pot. Suec. Exsic. nos. 45, 46. Dr. Graebner (*Das Pflanzenreich*, 90) makes "*P.*

nitens f. *latifolia* Tis. herb." a synonym of the above. Anyhow, it is the same as my var. *maximus*, which must be expunged. Mr. Scully's specimens from River Laune, near Lakes of Killarney, exactly agree with Dr. Tiselius's Jemtland examples.

The following note is an addition to the altitudinal notes on altitude (Journ. Bot. 1907, 373):—*P. nitens* Weber from Loch Oss on Ben Oss, at 2084 ft. (Ben Oss, 3374 ft.), Mid-Perth, W. H. Evans sp. In the *Flora of Perth* "above 1000 ft. in Highland Isla" is given.

P. PERFOLIATUS L. f. CRENATUS mihi. Lago Alsenis in Lombardia, 1876, leg. Parlatore ex Caruel. This in habit is the widest departure from the typical plant I have seen. The internodes are very short, and towards the apex the leaves are closely imbricated, subrotund, with the margins deeply crenated, the crenations recurved, the portion of the leaf between forming cup-like semicircles on the leaf-margins. I have seen nothing like this.

P. SALICIFOLIUS Wolfgang. Dr. Hagström notes on the Herefordshire Wey plant:—"This cannot be regarded as an independent species. I have seen specimens from Wilna collected by Wolfgang himself. They are *P. gramineus* × *perfoliatus* = *P. nitens* Weber, belonging to the form called *subperfoliatus*. The Swedish form *prælongifolius* Tis. is almost perfectly the same. Other forms from Wilna, also labelled *P. salicifolius* Wolfg., are the same as *P. lithuanicus* Gorski, which is *lucens* × *perfoliatus* = *P. decipiens* Nolte, and very near the Swedish form named f. *javedsdensis* Tis. We may perhaps label the plant from Wey '*P. gramineus* L. × *perfoliatus* L. (*P. nitens* Web.), *subperfoliata* f. *salicifolia* (Wolfg.).'" Mr. Fryer considers Mr. Ley's plant to be "a hybrid of unknown origin" (Bab. Man. ed. 9, 439). The specimens I possess of Wolfgang's plant from Besser and himself are the same as *lithuanicus* Gorski from that author. They are certainly not *nitens* Web., nor are they to me *decipiens* Nolte (sensu stricto). I think that Wolfgang's plant is *lucens* × *alpinus* (see Journ. Bot. 1903, 165), that is, those specimens that are referable to *lithuanicus*. Dr. Tiselius places these with his *P. upsaliensis*, which is variable, and probably contains among the specimens two (if not three) hybrids.

P. HETEROPHYLLUS × NITENS (*P. gramineus* × *nitens* Aschers. & Graeb.) = *P. intermedius* Tis. ex Fryer in Journ. Bot. 1890, 178. In the Basingstoke Canal between Frimley and Woking occur in considerable quantity specimens that can be referred neither to *nitens* nor *heterophyllus* with any certainty; both occur in close proximity, and they seem to be the above-named hybrid. If Dr. Graebner is right in putting under it *P. nitens* var. *merloensis* Tis. and var. *innominata* Tis., as well as his *intermedius*, the hybrid has a somewhat wide range. My specimens were gathered in August, 1888, and have remained since without a name.

(To be continued.)

SOMERSET PLANT-NOTES FOR 1907.

By Rev. E. S. Marshall, M.A., F.L.S.

Although June and July were blank months, I had a good season in the county, and a fine September gave opportunity for an unusual amount of autumn work. My neighbour Mr. W. D. Miller shared in several excursions; I also had the pleasure of meeting Mr. C. E. Salmon, at Bridgwater, for two or three walks in that neighbourhood. New vice-comital records are starred. Districts 1 to 4 belong to 5. S. Somerset; the rest to 6. N. Somerset. As usual, correspondents have kindly given me much help in determining critical specimens.

Anemone nemorosa L. 5. The rosy-flowered form abounds in Pitney Wood, associated with the type; I do not consider it more than a colour-variation.

Ranunculus Drouetii F. Schultz. 2. Stolford. 3. Plentiful on West Sedgemoor. 5. Pitney.—*R. heterophyllus* Weber. 2. Near Porlock Weir.—*R. sceleratus* L. 3. West Sedgemoor. 5. Chedzoy. —*R. sardous* Crantz. 2. Damp meadows near Porlock Weir and Stolford; native.—*R. parviflorus* L. 3. Pickeridge, near Corfe; W. Monkton. 5. Pitney.—*R. arvensis* L. 5. Compton Dundon.

Berberis vulgaris L. 2. Wood near Bossington; I believe, native. — *B. Aquifolium* × *vulgaris*. 2. Hedge, between Bossington and Hurlstone Point; see Journ. Bot. 1907, 393.

Glaucium flavum Crantz. 2. St. Audries.

Corydalis claviculata DC. 2. Porlock Weir.

Fumaria Boræi Jord. 2. Frequent about Porlock.—*F. confusa* Jord. 2. Bossington.

Cheiranthus Cheiri L. 9. Well established on limestone cliffs between Worle and Kewstoke, not very near houses.

Radicula Nasturtium-aquaticum Rendle & Britten var. *siifolia* Druce. 2. Williton. 3. W. Monkton. Rather a robust state, I believe, than a good variety. — *R. palustris* Moench. 4. Chard Reservoir, in plenty. 5. Chedzoy.

Cardamine pratensis L., *flore pleno*. 3. Near some ornamental water at W. Monkton Rectory.

Erophila verna E. Meyer, subsp. *stenocarpa* (Jord.). *3. Wall at Wick, near Langport. *5. Wall-tops, Pitney; new for Somerset. — *E. præcox* DC. 3. Near Corfe. 5. Charlton Mackrell; abundant on walls.

Cochlearia danica L. 2. Still in flower on Sept. 23rd, among shaded rocks near Hurlstone Point; fine and locally abundant on the beach near Bossington.

Brassica nigra Koch. 2. Coast, St. Audries to Kilve. 5. Chedzoy.

Coronopus didymus Sm. 2. Bossington. 3. Combwich.—*C. procumbens* Gilib. 2. Stolford. 3. Combwich. 5. Compton Dundon; Chedzoy. 8. Burnham; Huntspill. 9. Uphill; Worle.

Lepidium heterophyllum Benth. var. *canescens* Gren. & Godr. (*L. Smithii* Hook.). 1. Near King's Brompton. 2. Coast near Porlock.

Thlaspi arvense L. 5. Weston Zoyland.

Viola odorata L., forma *lilacina*. 5. Frequent about Somerton and Compton Dundon.—*V. hirta* L. 3. Pickeridge; Corfe. 5. Pitney. —*V. sylvestris* Kit. 3. Abundant about Curry Rivell and Fivehead; also about Corfe and Pitminster. 5. Everywhere in woods on the Lias, near Somerton, Compton Dundon, and Kingweston; Pitney.

Polygala vulgaris L. 2. Hills above Culbone.—*P. serpyllacea* Weihe. 2. Culbone; Bossington.

Silene maritima With. 2. Shingly beach, between Porlock Weir and Hurlstone Point.

Moenchia erecta Gaertn. Locally plentiful near Porlock Beach, associated with *Cerastium tetrandrum*.

Stellaria aquatica Scop. 5. Chedzoy.—*S. neglecta* Weihe, var. *umbrosa* (Opiz). 2. Common about Bossington, Porlock, and Culbone. 3. Corfe. A form of the type, with the hairs of the pedicels and calyces *gland-tipped*, was noticed at 2. Washford, and 3. W. Monkton, and may perhaps prove to be not uncommon.

Arenaria leptoclados Guss. 1. Near King's Brompton. 2. Bossington. 3. Bridgwater, Cannington, &c. 5. Charlton Mackrell; Chedzoy.—*A. peploides* L. 2. Beach at Stolford.

Sagina maritima Don. 2. Stolford; Porlock Weir and Beach —mostly a decumbent form (var. *prostrata* Towns. ?).—*S. ciliata* Fr. 2. Coast near Porlock; Stert. 5. Walls at Chedzoy.—*S. subulata* Presl. 2. Hilly ground near Bossington; frequent.

Spergula arvensis L. 1. Fields between E. Anstey and Brushford.

Spergularia rubra Pers. 2. Hurlstone Point, &c., near Bossington. — *S. salina* Presl. 2. Porlock Weir. — Var. *neglecta* (Syme). 2. Bossington; common about Stolford and Stert.— *S. marginata* Kittel. 2. Bossington. 8. Coast near Highbridge and Huntspill. — Var. *glandulosa* Druce. 2. Stolford to Stert. 3. By the tidal Parret, from its mouth up to Combwich.—**S. rupestris* Lebel. 2. Cliffs at Hurlstone Point; very scarce, but it will doubtless be found in various places along that part of the coast, if searched for. An addition to the county list.

Montia fontana L. 1. Near King's Brompton. 2. Porlock.

Hypericum montanum L. 9. Sparingly by the Kewstoke Road, a little north of Weston-super-Mare.—*H. elodes* L. 1. Beer Moors, &c., near E. Anstey.

Malva moschata L. 2. Bossington; St. Audries. 4. Near Chard.—*M. rotundifolia* L. 2. Bossington. 5. Chedzoy.

Linum angustifolium Huds. 5. Compton Dundon.

Geranium pyrenaicum Burm. fil. 5. Wall at Chedzoy; one plant.—*G. pusillum* L. 2. Wall Common, between Stolford and Stert.—*G. columbinum* L. 1. Skilgate; near E. Anstey. 2. Porlock Weir; Washford.—*G. Robertianum* L., var. *purpureum* (Vill.). 2. Porlock Beach; Stolford to Stert. — Var. *modestum* (Jord.). 9. On limestone, about Worle and Kewstoke.

Erodium cicutarium L'Hérit. var. **glandulosum* Bosch. 2. Sandy coast, Stert. A second glandular form of more luxuriant growth occurs here and at Stert Point, which has the leaf-cutting of var. *chærophyllum* (Cav.).

Genista tinctoria L. 3. Locally abundant on the tableland south of Pickeridge, Corfe.

Ulex Gallii Planch. 1. Skligate; Upton. 2. Crowcombe Heathfield.

Cytisus scoparius Link. 2. Bossington; Culbone.

Ononis repens L. 2. Bossington; coast, St. Audries to Kilve. —Var. *horrida* Lange. *2. Sandy coast, Stert, in plenty.

Trigonella ornithopodioides DC. 2. Abundant on the coast between Porlock Weir and Hurlstone Point.

Medicago arabica Huds. 2. Washford; Stolford. 8. Burnham.

Melilotus altissima Thuill. 2. Stolford. 5. Compton Dundon.

Trifolium subterraneum L. 2. Coast near Porlock; abundant. —*T. squamosum* L. 2. Stolford.—*T. arvense* L. 2. Porlock Beach; local. 9. Weston-super-Mare.—*T. striatum* L. 2. Porlock Weir.—*T. scabrum* L. 2. Coast, Stert; Stolford.—*T. fragiferum* L. 2. Stolford. 3. Combwich. 8. Huntspill.—*T. filiforme* L. 2. Porlock Weir.

Lotus tenuis Waldst. & Kit. 3. Roadside near Combwich. 5. Compton Dundon; locally abundant and most characteristic.

Ornithopus perpusillus L. 2. Coast near Porlock.

Vicia hirsuta Gray. 1. Between E. Anstey and Brushford. 2. Porlock Beach. 3. W. Monkton. 9. Between Worle and Kewstoke.—*V. tetrasperma* Moench. 3. W. Monkton; scarce.—*V. gracilis* Lois. 2. Stony, bushy beach, west of Stolford; associated with *Lathyrus Nissolia*. This station (where Mr. Salmon detected it) is, in our opinion, clearly a natural one, as it is far from cultivated land.—*V. angustifolia* L. 2. Porlock Beach, and elsewhere in that neighbourhood.

Lathyrus sylvestris L. 2. Bossington; between St. Audries and Kilve.—*L. latifolius* L. 4. This appears to have become established by the line, close to Hatch Station.—*L. montanus* Bernh. var. *tenuifolius* Roth. 2. Woods about Porlock and Culbone, in plenty; often well-marked, but connected with the type by intermediates.

Rubus plicatus L. 1. Near E. Anstey; King's Brompton.—*R. carpinifolius* Wh. & N. 3. On the Quantocks, near Cothelstone.—*R. argenteus* Wh. & N. ("*erythrinus*"). 1. Common about E. Anstey and Brushford; Skilgate. 2. Bossington.—*R. Lindleianus* Lees. 3. Quarry above W Monkton.—*R. rhamnifolius* Wh. & N. 2. King's Brompton. 3. Cothelstone.—*R. Godroni* Lecoq & Lamotte ("*argentatus*"). 3. W. Monkton.—*R. leucostachys* Sm. 1. Common about E. Anstey and Brushford; Skilgate; Upton.—*R. lasioclados* Focke var. *angustifolius* Rogers. 3. W. Monkton.—*R. Drejeri* G. Jensen. 1. E. Anstey to Brushford. 3. W. Monkton.—**R. ericetorum* Lefv. 1. Between E. Anstey and Brushford; named by Rev. W. Moyle Rogers, like most of the brambles here recorded. Apparently new for the county.—*R. scaber* Wh. & N. 1. Near E. Anstey.—*R. rosaceus* Wh. & N. 1. Upton. *5. Plentiful in and about Great Breach Wood, Compton Dundon.—*R. dasyphyllus* Rogers ("*pallidus*" Bab.). 3. W. Monkton.—*R. corylifolius* Sm. 2. Bossington. 3. Durston. 5. Chedzoy; Weston Zoyland.

Potentilla erecta × *procumbens*. 1. Skilgate.—*P. procumbens* Sibth. 1. Upton; Skilgate.

Poterium Sanguisorba L. 2. Abundant on the Lias about St. Audries and Kilve.

Rosa tomentosa Sm. (aggregate). 5. Compton Dundon.—*R. Eglanteria* Huds. (*rubiginosa* L.). 5. Scarce, but clearly native, on a bushy hill overlooking Compton Dundon.—*R. agrestis* Savi (*sepium* Thuill.). 5. Between Somerton and Kingweston; only one small bush was seen. Fruit narrow; apparently the type, which is new for Somerset.

Pyrus Aria Ehrh. 9. Limestone cliff between Worle and Kewstoke; also a little north of Weston-super-Mare.

Saxifraga umbrosa L. 2. Stream-side above Culbone, naturalised; the Pyrenean type.

Chrysosplenium oppositifolium L. 2. Porlock Weir; Culbone. 3. Above Pitminster.

Cotyledon Umbilicus-Veneris L. 2. Porlock, Culbone, &c.; abundant. 5. Charlton Mackrell; Pitney.

Sedum anglicum Huds. 2. In profusion on the coast near Porlock.—*S. Forsterianum* Sm. 2. In a damp rocky wood near Culbone the dark-green slender type occurs; in cultivation I find that it keeps quite distinct from the Porlock Weir and Minehead coast-plant, which becomes more robust and is decidedly glaucous; this is the var. *glaucescens* Wats.

Myriophyllum spicatum L. 2. Abundant in ditches near Stolford. 5. Weston Zoyland. — *M. alterniflorum* DC. 1. Near King's Brompton, in a tributary of the Haddeo; no doubt this is the species observed in the Exe and Barle by Rev. R. P. Murray. 4. Chard Reservoir.

Callitriche intermedia Hoffm. (*hamulata* Kuetz.). 2. Porlock Weir. 3. Common in the ditches on West Sedgemoor. 5. Chedzoy; Pitney; in the Cary, near Somerton.—*C. obtusangula* Le Gall. 2. Stolford; Stert. 5. Chedzoy; Weston Zoyland. **C. truncata* Guss. 4. Chard Reservoir, in good quantity; no fruit was present, as it was only found on September 16th, but it is clearly this species. A very interesting novelty for the county.

Peplis Portula L. 1. Near King's Brompton.

Lythrum Salicaria L. 1. By the Barle, near Dulverton Station. 2. Washford; Kilve. 5. Weston Zoyland.

Epilobium angustifolium L. 3. Corfe.—*E. palustre* L. 1. In bogs about E. Anstey, Brushford and King's Brompton.—*E. montanum* × *obscurum*; *E. obscurum* × *parviflorum*. 5. Great Breach Wood, Compton Dundon.

Hydrocotyle vulgaris L. 1. King's Brompton. 4. Chard Reservoir.

Eryngium maritimum L. 2. Stolford.

Smyrnium Olusatrum L. 2. Near Minehead; Porlock; Bossington.

Bupleurum tenuissimum L. 2. Stolford. 3. Combwich.

Apium graveolens L. 2. Stolford; Stert. — *A. inundatum* Reichb. fil. 5. Ditch near Weston Zoyland. It is said to be "very rare" (Fl. Som.).

Carum segetum Benth. & Hook. fil. 2. Ditch-banks, Stolford. 3. Ditch-sides between Stert and Combwich. 5. Banks on the Lias, near Pitney. Clearly native.—*C. Petroselinum* Benth. & Hook. fil. 2. Naturalized at Bossington.

Sison Amomum L. 1. Near King's Brompton. 2. Porlock; Bossington; Kilve. 3. Bridgwater, &c.; N. Petherton. 5. Charlton Mackrell. 8. Huntspill.

Sium latifolium L. 5. Weston Zoyland.—*S. erectum* Huds. 4. Chard Reservoir.

**Myrrhis Odorata* Scop. 2. By the stream in the combe above Culbone Church; probably naturalized, though no houses were seen near it. New for Somerset.

Crithmum maritimum L. 2. In plenty on cliffs at Hurlstone Point; sparingly on the beach near Stert.

Œnanthe pimpinelloides L. 3. Combwich. 5. Common about Somerton and Compton Dundon.—*O. Lachenalii* C. Gmel. 3. Abundant in ditches, &c., from Stert to Combwich. 5. Between Bridgwater and Chedzoy.—*O. aquatica* Poir. (*Phellandrium* Lam.). 3. West Sedgemoor. 5. Common about Chedzoy and Weston Zoyland. 9. Marsh by Worle Station.

Caucalis nodosa Scop. 2. Minehead; Bossington; Stolford.

Adoxa Moschatellina L. 3. Corfe.

Viburnum Opulus L. 5. Pitney; Kingweston.

Rubia peregrina L. 3. Corfe; Curry Rivell. 5. Pitney; Somerton; Kingweston. 9. About Kewstoke and Weston-super-Mare.

Galium Cruciata Scop. 2. Culbone; Bossington. 3. Cothelstone.—*G. Mollugo* L. var. *Bakeri* Syme. 2. Bossington.—*G. palustre* L. var. *elongatum* (Presl). 3. Chedzoy; Weston Zoyland, &c. —Var. *Witheringii* (Sm.). 1. Common about E. Anstey and Dulverton.—*G. uliginosum* L. 1. Hill-bogs near E. Anstey.

Asperula odorata L. 2. Culbone. 3. Corfe; Pitminster; near Langport. 5. Pitney.—*A. cynanchica* L. 9. About Worle and Kewstoke.

Valeriana dioica L. 3. Feltham, near Pitminster.

Kentranthus ruber DC. 2. Well established on the shingly beach at Porlock Weir.

Scabiosa Columbaria L. 2. Coast near Williton, on the Lias. 5. Compton Dundon.

Solidago Virgaurea L. 1. Upton. 2. Stogumber.

Aster Tripolium L. 2. Porlock Weir.

Filago germanica L. 1. Between E. Anstey and Brushford. 2. Porlock Weir; Bossington.

Gnaphalium uliginosum L. 1. Bury; near E. Anstey. 4. Chard Reservoir.

Inula squarrosa Bernh. (*Conyza* DC.). 2. Bossington. 3. Corfe; Bishop's Lydeard. 5. Compton Dundon.

Bidens tripartita L. 4. Chard Reservoir. 5. Chedzoy.

Anthemis Cotula L. 2. Bossington; Kilve; sparingly on the stony beach near Stolford—this is a prostrate, rather fleshy form. It may possibly be the var. *maritima* Bromf., which I have not seen.—*A. nobilis* L. 2. Near the sea, Bossington.

Chrysanthemum segetum L. 5. Fields at Chedzoy.

Matricaria inodora L. var. *salina* Bab. 2. Porlock Weir; Stert. 8. Abundant by submaritime ditches, near Highbridge and Huntspill.—*M. Chamomilla* L. 2. Bossington. 9. Worle.

Tanacetum vulgare L. 3. Between Bridgwater and Cannington.

Artemisia maritima L. var. **gallica* (Willd.). 3. Banks of the tidal Parret below Combwich; with the type, but much less plentiful.

Petasites ovatus Hill (*officinalis* Moench). 2. Bossington; Washford. 4. Beercrocombe.

Senecio sylvaticus L. 1. Bury; about E. Anstey and Brushford. 2. Porlock Weir.—*S. viscosus* L. 5. In many places by the railway, about Somerton and Langport; introduced.—*S. erucifolius* L. 2. Williton. 5. Pitney; Compton Dundon; Chedzoy; Weston Zoyland. 8. Huntspill.

Carlina vulgaris L. 2. Bossington; Kilve. 3. Corfe. 5. Kingweston; Pitney, &c.

Carduus pycnocephalus L. var. *tenuiflorus* (Curt.). 2. Hillside above Hurlstone Point, Bossington; abundant on the coast between Stolford and Stert.—*C. crispus* L. 5. Charlton Mackrell.

Cnicus eriophorus Roth. 5. Pitney; Kingweston.—*C. acaulis* Willd. 2. Abundant about St. Audries and Kilve. 5. Pitney; Kingweston, &c. 9. Kewstoke.—*Var. *caulescens* Pers. Well marked and locally plentiful in pastures on the Lias, about Compton Dundon and Somerton.

Serratula tinctoria L. 3. Corfe. 9. Between Kewstoke and Weston-super-Mare.

Cichorium Intybus L. 2. Bossington; Washford.

Picris echioides L. 2. Bossington; Kilve. 3. Between Combwich and Stoke Courcy, frequent. 5. Chedzoy; Weston Zoyland.

Hieracium boreale Fr. 2. Porlock Weir; Culbone.—*H. umbellatum* L. *var. *monticola* Arv.-Touv. 1. Valley of the Haddeo. 2. Culbone.

Leontodon nudicaule Banks & Soland. (*hirtum* L.). 2. Coast, Stert.

Taraxacum palustre DC. 2. Damp meadows near Porlock Decoy.—Subsp. *udum* (Jord.). 2. Near Porlock. 3. West Sedgemoor. 5. Kingweston.

Lactuca muralis Gaertn. 2. Porlock Weir.

[*L. Serriola* L. 3. I saw this in some quantity by the railway, west of Langport—an accidental introduction, of course.]

Sonchus arvensis L. *var. *glabrescens* Hall. 3. Very scarce, on the Parret bank between Stert and Combwich.

Jasione montana L. 1. About E. Anstey, Brushford, Upton, and Skilgate. 2. Porlock Weir.—*Var. *major* Mert. & Koch. 2. Cliffs, Hurlstone Point.

Wahlenbergia hederacea Reichb. 1. Plentiful by a tributary of the Haddeo, near King's Brompton.

Erica Tetralix L. 1. E. Anstey; Upton; Skilgate.

Statice maritima Mill. 2. Porlock Weir, &c.

Primula veris × *vulgaris*. 5. Kingweston.

Lysimachia vulgaris L. 5. Chedzoy; Weston Zoyland.—*L. Nummularia* L. 5. Chedzoy; Middlezoy. 8. Burnham.—*L. nemorum* L. 1. Between E. Anstey and Brushford. 2. Culbone.

Glaux maritima L. 2. Stolford; Porlock Weir, &c.

**Centunculus minimus* L. 1. Damp ground near the Brockey River, between E. Anstey and Brushford; previously known from only two Somerset stations, in district 7.

Samolus Valerandi L. 2. Stolford. 5. Chedzoy; Weston Zoyland. 8. Huntspill. 9. Swamp by Worle Station.

Ligustrum vulgare L. 2. Hurlstone Point. 3. Corfe; Pitminster; 4. Hatch Beauchamp. 5. Compton Dundon. Native in all these stations, and plentiful in most of them.

Vinca minor L. 1. In a lane about halfway between E. Anstey and Brushford.

Blackstonia perfoliata Huds. 2. Abundant on the coast, St. Audries to Kilve. 9. Worle.

Centaurium umbellatum Gilib. (*Erythræa Centaurium* Pers). 1. Between E. Anstey and Brushford. 2. Above Hurlstone Point. —*C. pulchellum* Druce. 4. Chard Reservoir, in small quantity.

Myosotis cespitosa Schultz. 2. Porlock Weir; Bossington.—*M. scorpioides* L. (*palustris* Hill). 4. Chard Reservoir.—*M. repens* G. & D. Don. 1. Near King's Brompton.—*M. versicolor* Sm. 2. Coast, Porlock Weir to Bossington.

Lithospermum officinale L. 5. Near Somerton.—*L. arvense* L. 5. Roadside between Langport and Pitney.

Echium vulgare L. 2. Porlock Weir.

[A *Cuscuta* was seen in June on the Burnham sandhills, parasitic on *Lotus*: I think from the habit that it was *C. Trifolii* Bab. but it was not yet in flower.]

Solanum nigrum L. 5. Weston Zoyland.

Hyoscyamus niger L. 3. Pickeridge, near Corfe, *W. D. Miller*!

Verbascum Thapsus L. 2. Bossington; St. Audries.—*V. virgatum* Stokes. 3. I have found this in a second station near W. Monkton, a mile and a half from that previously recorded, and think that it may be native; it persists in the first-found locality. —*V. Blattaria* occurs as a weed in the grounds at Hestercombe, *W. D. Miller*!

Linaria Elatine Mill. 3. W. Monkton, scarce.—*L. spuria* Mill. 5. Ride in Great Breach Wood; also in fields near Compton Dundon.

Mimulus Langsdorffii Donn. 1. Naturalized by the Haddeo, near Hartford (var. *guttatus*). 3. Streamlet below Coombe, W. Monkton.

Sibthorpia europæa L. In a bog near King's Brompton.

Veronica montana L. 2. Culbone. 5. Kingweston.—*V. scutellata* L. 1. King's Brompton; Beer Moors, E. Anstey.—*V. Anagallis-aquatica* L. 2. Stolford. 4. Chard Reservoir.

Euphrasia Rostkoviana Hayne. 1. E. Anstey.—*E. borealis* Towns. 9. Between Worle and Kewstoke, on limestone.—*E. nemorosa* H. Mart. 1. E. Anstey. 5. Abundant on Polden, about Compton Dundon, &c.—*E. scottica* Wettst.—1. In boggy places near E. Anstey. — *E. curta* Wettst. var. *glabrescens* Wettst. 1. About E. Anstey and Brushford. 8. Burnham.

Pedicularis sylvatica L. 2. Above Culbone. 3. Hills above Corfe.

Melampyrum pratense L. var. *hians* Druce. 1. Frequent in the valley of the Haddeo.

Lathræa Squamaria L. 3. Woodlands above Pitminster, scarce.

Pinguicula lusitanica L. 1. Beer Moors, E. Anstey.

Mentha alopecuroides* Hull. 2. Several fine clumps near the coast, Bossington; new for Somerset, and I believe a genuine native here. Rev. E. F. Linton has suggested that this segregate may really be *M. aquatica* × *rotundifolia*, and I consider it very probable; both the suggested parents occur close to it, and the fact that the clumps are not exactly like confirms this view. Some specimens which I found are, I believe, *M. alopecuroides* × *rotundifolia*, the foliage and floral structure being more or less intermediate; a good root is in cultivation, so I hope to get further evidence. — *M. longifolia* Huds. 9. The Berrow plant recorded last year flowered well in my garden, and proves to be var. *nemorosa*.—*M. piperita* L. 1. An escape at Hartford, in the valley of the Haddeo. 2. By the brook at Bossington. To illustrate the effect of the cold backward season, I may mention that even on September 14th only one stem was in very young bud, so that it probably did not succeed in flowering.—M. piperita* × *sativa*. 1. To this origin I confidently refer a curious Mint which grew at Hartford, close to both parents. As *M. piperita* is itself supposed (with much probability) to be *aquatica* × *spicata*, we have here a curious crossing of *two* hybrids. General habit of *sativa*, but leaves deeper green, the lower very distinctly stalked, more strongly serrate and glabrescent; smelling strongly of Peppermint.—*M. aquatica* × *arvensis* (*sativa* L.). 1. Valley of the Haddeo, in two or three places. 2. Bossington.—*M. arvensis* L. *var. *agrestis* (Sole). 2. Near Bossington; very hairy, with remarkably rugose foliage. Messrs. Bickham, D. Fry, and E. F. Linton agree in considering it to be the plant described and figured by Sole, and said by him to be common in some parts of N. Somerset.

Lycopus europæus L. 2. Porlock Weir; Bossington; Kilve.

Calamintha montana Lam. (*officinalis* Moench). 2. Bossington; both type and what I believe to be var. *Briggsii*, though not extreme. 3. Durston; N. Petherton; Bridgwater. 9. Worle.

Melissa officinalis L. 3. Roadside near Cheddon Fitzpaine.

Salvia Verbenaca L. 9. Between Worle and Kewstoke.

Scutellaria galericulata L. 3. Bathpool; pond and ditch at Hestercombe. 4. Chard Reservoir.—*S. minor* L. 1. Beer Moors, &c., near E. Anstey.

Marrubium vulgare L. 2. Beach between Stolford and Stert, frequent and doubtless indigenous.

Stachys officinalis Trev. (*Betonica* Benth.). 1. Abundant in the Haddeo Valley.—*S. palustris* × *sylvatica*. 1. By the Haddeo at Hartford; exactly Smith's *S. ambigua*.

Galeopsis Tetrahit L. var. *bifida* (Boenn.). 2. Coast near Bossington, scarce.

Lamium amplexicaule L. 5. Weston Zoyland.—*L. Galeobdolon* Crantz. 2. Culbone. 3. Corfe; Pitminster. 5. Pitney.

Teucrium Scorodonia L. Abundant about Skilgate, Upton, &c. 2. Porlock Weir; Culbone; St. Audries.

Plantago maritima L. 2. Bossington. 3. Plentiful, Stert to Combwich. 8. Highbridge.—*P. Coronopus* L. 2. Bossington; Stert. 3. Combwich. 8. Highbridge.

Littorella uniflora Aschers. 4. Chard Reservoir; the first definite record for v.-c. 5.

Chenopodium polyspermum L. 4. Chard Reservoir, in plenty. 5. Clearing in Great Breach Wood, Compton Dundon. — Var. *cymosum* Moq. 3. Farmyard between Combwich and Cannington. 4. Chard Reservoir, rather scarce. — *C. album* L. var. *viride* (L.). 5. Abundant in fields at Weston Zoyland.—*C. serotinum* L. (*ficifolium* Sm.). 5. Farmyard, Compton Dundon. — *C. urbicum* L. *var. *intermedium* Moq. 2. Farmyard, Kilve. 3. Farmyard between Combwich and Cannington. — *C. rubrum* L. 2. Stert; Kilve. 3. Combwich, and between Combwich and Cannington. 4. Chard Reservoir, in enormous quantity on and near the shores, which were more exposed than usual, owing to the dry early autumn. On stony ground at the north end grows a singularly pretty form, of which Mr. Arthur Bennett writes, "It seems to be very near var. *pumilum* Bréb. (under *Blitum polymorphum* Meyer), but slightly larger." 5. Chedzoy. 9. Worle. — *Var. *pseudobotryoides* Wats. 4. Locally abundant and very characteristic in wet sandy ground on the east side of Chard Reservoir (dwarf states of the type were frequent in other parts); not previously observed in Somerset. — *C. Bonus-Henricus* L. 5. Weston Zoyland.

Beta maritima L. 3. Abundant near the Parret, from Combwich to its mouth.

Atriplex Babingtonii Woods. 2. Between St. Audries and Kilve; between Stolford and Stert. — *A. laciniata* L. 2. Plentiful in sand at Stert Point; a confirmation of Collins's record for v.-c. 5.

**Salicornia ramosissima* Woods. 2. Between Stolford and Stert. 3. Saltmarsh near the mouth of the Parret, in great abundance. — *S. procumbens* Sm. 8. In profusion near the mouths of the Brue (south side) and the Parret. 9. Scarce near Uphill.—*S. *appressa* Dum. 2. On half-dried mud between Stolford and Stert, in two distinct stations. New for the county.

Suæda maritima Dum. 2. Porlock Weir; Bossington. 3. Highbridge.

Salsola Kali L. 2. Stolford.

Polygonum Raii Bab. 2. Stert Point, plentiful. — *P. mite* Schrank. 5. Mr. Salmon gathered a single specimen near Weston Zoyland which he refers to this species. — *P. lapathifolium* L. 2. Bossington. 4. Chard Reservoir. — **P. maculatum* Trim. & Dyer. 4. Chard Reservoir, in plenty.—*P. amphibium* L. 2. Stolford. 5. Chedzoy; Weston Zoyland. 8. Huntspill. 9. Marsh by Worle Station. — *P. Bistorta* L. 1. Valley of the Haddeo, near Hartford.

**Rumex conglomeratus* × *pulcher*. 5. Damp meadow, Chedzoy,

with the parents. — *R. limosus* Thuill. 4. *Chard Reservoir, abundant at the south-west end. 5. Ditch near Weston Zoyland. — *R. pulcher* L. 2. Stert. 5. Chedzoy, plentiful; Weston Zoyland.

Daphne Laureola L. 3, 4. Hatch Beauchamp.—**D. Laureola* × *Mezereum*. 5. Two bushes found growing with abundance of *D. Laureola* on the borders of a wood between Somerton and Kingweston (parish of Compton Dundon) are, I believe, this hybrid in a different form from that which I found some years ago in West Sussex. The leaves are glossy and evergreen, but thinner and more impatient of frost than in *Laureola*; of a yellower green, resembling *Mezereum* in size, shape, and veining. Flowers greenish-white, usually reddish externally; the corolla-segments broader and blunter than in ordinary *Laureola*. In habit and bark the bushes are nearer to *Mezereum*. Although I failed to discover that species anywhere near, and it is not on record for that district, it may yet occur, or may have been exterminated. I am convinced that *Laureola* is the female parent; the other species is a favourite ornament of cottage gardens, so that insects could easily convey its pollen from a considerable distance.

Viscum album L. 5. Pitney.

Euphorbia amygdaloides L. 3. Woods near Corfe and Pitminster.

Mercurialis annua L. 9. Cultivated ground between Worle and Kewstoke.

Ulmus glabra Huds. (*montana* Stokes). 2. Culbone; Bossington. 3. Woods near Corfe. 9. Between Kewstoke and Weston-super-Mare. Native, I believe, in all these stations.

Humulus Lupulus L. 2. Bossington; Williton; Kilve. 3. Kingston. 5. Weston Zoyland.

Parietaria ramiflora Moench. 1. Skilgate. 2. Bossington.

Myrica Gale L. 1. Locally abundant in boggy ground descending from Beer Moors, E. Anstey, to the Brockey River. Not previously recorded from West Somerset, and quite rare in the county.

Carpinus Betulus L. 5. Wood between Somerton and Kingweston, probably planted.

Salix aurita L. 1. Near E. Anstey.—*S. repens* L. 8. A little north of Burnham, near the coast.

Populus tremula L. 5. Woods near Somerton and Compton Dundon.

Ceratophyllum submersum L. 9. Ditch and pond near Worle Station, fruiting freely.

Elodea canadensis Michx. 1. Valley of the Haddeo, &c.

Orchis ericetorum Linton. 3. West Monkton, in a moist meadow above Walford.

Ophrys apifera L. 5. Between High Ham and Pitney.

Iris fœtidissima L. 2. Near Allerford. 3. Near Pitminster; Cannington. Mr. Corder, of Bridgwater, tells me that var. *citrina* Bromf., not recorded for Somerset, was sent to him from the Polden Hills (either district 5 or 8) last summer.

Allium vineale L. 3. Between N. Curry and Fivehead. 5. Pitney. As usual, the var. *compactum* (Thuill.).

Paris quadrifolia L. 3. Adcombe Wood, near Pitminster.

Juncus Gerardi Lois. 2. Porlock Weir; common about Stolford and Stert.

Luzula sylvatica Gaud. 1. Haddeo Valley, near Hartford.

Typha latifolia L. 4. Chard Reservoir. 5. Weston Zoyland. —*T. angustifolia* L. 4. Swamp at the north-east end of Chard Reservoir.

Sparganium simplex L. 2. Stolford. 3. Combwich. 5. Weston Zoyland.

Lemna gibba L. 2. Common about Stolford and Stert. 5. Chedzoy; Weston Zoyland.

Alisma ranunculoides L. 4. Chard Reservoir, in small quantity.

Sagittaria sagittifolia L. 2. Stolford. 3. Combwich. 5. Chedzoy; Weston Zoyland.

Butomus umbellatus L. 2. Stolford.

Triglochin palustre L. 5. Weston Zoyland.—*T. maritimum* L. 2. Stolford; Stert. 3. Abundant near the tidal Parret up to Combwich.

Potamogeton natans L. 9. Pond near Worle Station. — *P. lucens* L. 5. In the Cary, near Somerton. — *P. crispus* L.; *P. densus* L. 5. Pitney; Weston Zoyland.—*P. pusillus* L. 3. Pond at Hestercombe.—*P. pectinatus* L. 4. Chard Reservoir. 5. Weston Zoyland.—*P. flabellatus* Bab. 8. Near Highbridge.

Ruppia rostellata Koch. 2. Ditches between Stolford and Stert, in great quantity. 3. Combwich.

Zannichellia palustris L. 5. Weston Zoyland. — *Z. pedunculata* Reichb. 2. Ditch near Stert.

Scirpus Tabernæmontani Gmel. 2. Ditches between Dunster and Minehead; coast below Williton. 4. Chard Reservoir. 5. Ditch-sides near Weston Zoyland, plentiful.

**Eriophorum latifolium* Hoppe. 1. Swamp near the Brockey River, between E. Anstey and Brushford, abundant and luxuriant. A few days before, Mr. Salmon gathered one specimen in North Somerset—its first certain occurrence in the county.

Carex paniculata L. 4. Chard Reservoir. — *C. divulsa* Good. (*canescens* L. Herb. and Sp. Pl.). 2. Porlock; Bossington; Washford.—*C. echinata* Murr. 1. Near King's Brompton.—*C. leporina* L. (*ovalis* Good.). 1. Brushford; near King's Brompton. 2. Porlock Weir. — *C. Goodenowii* Gay. 2. A tall form, up to four feet high, grows by a ditch near Porlock Decoy. "I believe, *C. vulgaris* var. *elatior* Sonder, Fl. Hamburg," *Ar. Bennett, in litt.* 8. Near Burnham. — *C. panicea* L. 1. Near King's Brompton. 5. Moist meadows near Pitney.—*C. pendula* Huds. 3. Corfe; Pitminster. 5. Extraordinarily abundant about Somerton, Kingweston, and Charlton Mackrell. — *C. distans* L. var. *neglecta* (Degland). 2. Stert. — *C. Œderi* Retz. var. *œdocarpa* And. 1. Skilgate. — *C. hirta* L. 4. Chard Reservoir. — *Var. *spinosa* Mort. 2. Moist meadow near Porlock Weir. —

C. acutiformis Ehrh. 5. Pitney. — *C. riparia* Curt. 2. Kilve. 3. Combwich. 5. Weston Zoyland; Charlton Mackrell. 8. Near Burnham.

Phleum arenarium L. 2. Sandy coast, Stert.

Agrostis setacea Curt. 1. Abundant on Haddon Hill, above Skilgate. — *A. tenuis* Sibth. (*vulgaris* With.). 3. The diseased state called *A. pumila* L. occurred last summer on Cothelstone Hill.

Calamagrostis epigeios Roth. 2. Coast between St. Audries and Kilve.

**Deschampsia setacea* Richter (*discolor* R. & S.). 1. Beer Moors and other hill-bogs, between E. Anstey and Brushford; an interesting novelty for Somerset.

Phragmites communis Trin. var. *nigricans* Gren. & Godr. 9. Plentiful in a swamp by Worle Station.

Melica nutans L. (*uniflora* Retz.). 2. Culbone; Porlock Weir.

Poa nemoralis L. 2. Porlock Weir. 9. Worle.—*P. compressa* L. 5. Plentiful on limestone walls, Charlton Mackrell.

Glyceria fluitans Br. *var. *triticea* Fr. 5. Weston Zoyland.—*G. fluitans* × *plicata* (*pedicellata* Towns.). 2. Stolford.—*G. plicata* Fr. 2. Stolford. 5. Chedzoy. — *G. declinata* Bréb. 1. Near E. Anstey. 2. Washford; Stert. 3. Ditch at Hestercombe.—*G. aquatica* Wahlb. 2. Stolford. 8. Highbridge. 9. Near Worle. —*G. maritima* Mert. & Koch. 2. Coast near Porlock.—*G. distans* Wahlb. 2. Stolford. 3. Combwich. 9. Uphill.

Festuca rottbœllioides Kunth. 2. Stolford. — *F. bromoides* L. (*sciuroides* Roth). 2. Porlock Weir.—*F. elatior* L. 2. Abundant on the cliffs, St. Audries; Stolford. 4. Chard Reservoir. 5. Weston Zoyland. 8. Huntspill.

Bromus giganteus L. 1. About E. Anstey and Brushford; Bury. 2. Bossington; St. Audries. 3. W. Monkton. 5. Chedzoy. The var. *triflorus* Syme is, I think, not uncommon.—*B. ramosus* Huds. (*asper* Murr.). 2. Bossington; St. Audries.—*B. commutatus* Schrad. 2. Stolford. 8. Huntspill.

Lepturus filiformis Trin. 3. Parret banks, &c., below Combwich.

Hordeum nodosum L. (*pratense* Huds.). 2. Abundant about Stolford and Stert. 5. Chedzoy; Weston Zoyland.—*H. marinum* Huds. 2. Stolford, in profusion. 3. Near the Parret, between its mouth and Combwich. 9. Uphill.

Blechnum Spicant With. 2. Culbone.

Polystichum angulare Presl. 3. Corfe.

Lastrea Filix-mas Presl var. *paleacea* T. Moore. 2. Porlock Weir. — *L. spinulosa* Presl. 1. Between E. Anstey and Brushford.

Ophioglossum vulgatum L. 3. Pastures above Corfe.

Equisetum maximum Lam. 3. About Corfe and Pitminster. 4. Near Ilminster. — *E. palustre* L. 1. Between E. Anstey and Brushford.—*E. limosum* L. 4. Chard Reservoir; both type and var. *fluviatile* (L.).

Chara vulgaris L. 3. Ditch on West Sedgemoor, between

Fivehead and N. Curry. 5. Weston Zoyland. — *C. hispida* L. 5. Weston Zoyland.

**Tolypella intricata* Leonh. 5. Pond outside Pitney Wood; a small form, "with little-branched sterile branchlets" (*H. & J. Groves*). Discovered on March 21st; new to the West of England, and the first occurrence of this genus in Somerset.

SOMERSET PLANTS.

By C. E. Salmon, F.L.S.

The following records may be added to Mr. Marshall's paper, which I have seen in proof. The notes were made during last summer, shortly before meeting Mr. Marshall, and I had the advantage of rambles with Mr. J. W. White, of Clifton, and Dr. B. B. Gough, of Compton Martin:—

Brassica nigra Koch. 9. Wild on the cliffs of Brean Down.

Cakile maritima Scop. var. *sinuatifolia* DC. 9. Between Brean Down and Berrow.

Polygala oxyptera Reichb. 9. Cheddar.

Spergularia salina Presl. 2. The specimens that I collected with Mr. Marshall at Stolford will not do for *neglecta* (Syme), as the seeds have no papillæ. The plants are certainly hairy and glandular in the upper part, but the seed-character is of more importance. My specimens seem to fall midway between Syme's ideas (Eng. Bot. ed. 3) of *β salina* Presl and *γ media*. Richter (Pl. Europ.) unites all three (*S. salina* Presl, *L. neglectum* Kind., and *L. medium* Fr. & Kind.), but I think that view is rather extreme, and that the second may be separated from the others by its strongly papillose seeds.

Geranium pratense L. 9. Compton Martin.

Lotus tenuis W. & K. 9. By the Yeo, between Compton Martin and Ubley.

Vicia gracilis Lois. As previously mentioned by Mr. Marshall, this grew near Stolford, on very poor ground. In consequence the specimens are the reverse of luxuriant, and only show 2–5-seeded pods and few-flowered peduncles with corollas no larger than those of *tetrasperma*. The peduncles are, however, of the typical length of *gracilis*, and in examining the seeds an apparently undescribed distinction between the two species was noted. In *tetrasperma* the hilum is oblong and about half a line long, and the seed is practically sessile in the pod; in *gracilis* the hilum is much shorter and rounder and usually under a quarter of a line long, whilst the pod possesses a funiculus almost as long as the hilum. —*V. sylvatica* L. 10. Coley Hill.

Alchemilla vulgaris L. 9. The Compton Martin plant mentioned in Murray's Fl. Som. is var. *filicaulis* (Buser).

Sedum album L. 9. Walls and rocks, Blagdon. Doubtfully native here; it *may* have spread from the rocks to the walls, but I expect it is the reverse!

Hippuris vulgaris L. 5. Weston Zoyland. 9. Yeo Reservoir.
Peplis portula L. 9. Pond on Blackdown.
Epilobium roseum Schreb. 9. Compton Martin, common.
Apium graveolens L. 9. Near foot of Brean Down.
V. officinalis L. (*Mikanii* Syme). 9. Ubley side and roadside between Charterhouse and Blackdown.
Dipsacus pilosus L. 9. Compton Martin; East Harptree.
Filago minima Fr. 9. In Murray's Fl. Som. p. 185, Mr. Fry reports this from "cultivated ground at Brean Down"; I am glad to say I saw it there, in small quantity, on *untouched* ground.
Inula Helenium L. 9. Lower Nempnett!
Cnicus eriophorus Roth. 10. Roadside near Hinton Blewett.
Centaurium umbellatum Gilib. var. *capitatum* Druce. 9. Brean Down.
Euphrasia nemorosa H. Mart. 9. Compton Martin Wood.
Marrubium vulgare L. 9. Cheddar.
Galeopsis Tetrahit L. *var. *nigrescens* Breb. 9. Near the Sanatorium on Mendip. Besides the purple calyx-lobes, &c., another point distinguishes this variety: its preference for untouched ground rather than cultivated land.
Littorella uniflora Aschers. 9. In a pond on Blackdown, not flowering; under water. Very rare—or overlooked—in the whole county; in Murray's Fl. Som. one record, of Ray's, is given for N. Somerset, and one for S. Somerset in division 2 of the Flora without definite locality.
Chenopodium serotinum. L. *9. Brean, abundant in one spot, near a farmyard.—*C. Bonus-Henricus* L. 9. Compton Martin.
Rumex crispus L. *var. *trigranulatus* Syme. 9. Coast near Brean. Although this variety is included in Hooker's *Stud. Flora*, the last edition of Babington's *Manual*, &c., it is omitted from the ninth and the (new) tenth editions of the *London Catalogue*. It appears to be chiefly a coast form, and differs from ordinary *crispus* by habit, three large tubercles, &c. In West Lancashire (Wheldon & Wilson's *Flora*) this variety is rare and considered to be scarcely a native, whilst the ordinary *crispus* is recorded as "very common."
Hydrocharis Morsus-ranæ L. 9. Ditches near Congresbury, abundant.
Alisma lanceolatum With. 9. Yeo Reservoir.
Butomus umbellatus L. 3. Combwich. 5. Between Chedzoy and Bridgwater. 9. Near foot of Brean Down.
**Eriophorum latifolium* Hoppe. 9. Blackdown. First certain record for the whole of Somerset (see Murray's Fl. Som.).
Carex pulicaris L. 9. Blackdown.—*C. pendula* Huds. 9. Near Yeo Reservoir.
**Agropyron pungens* R. & S. var. *littorale* (Reichb.). 3. Parret bank below Combwich. As a species, new to South Somerset.
Hordeum maritimum Huds. 9. Uphill.

SHORT NOTES.

ANAGALLIS ARVENSIS AND A. CÆRULEA.—On referring to numbers of the Journal published while I was in South America, I came across Mr. Edwards's note on these plants (Journ. Bot. 1906, 368). His experience of them on the Inferior Oolite tallies exactly with my own on the Chalk at Oxted, Surrey, though I have not yet examined the corolla-hairs. I cannot say whether Borrer's opinion was original, or whether it was suggested by Newbould; but some years ago, before I had ever found *A. cærulea*, the latter botanist expressed to me his own conviction that there were two Blue Pimpernels to be found in England, a variety of *A. arvensis* and a distinct species *A. cærulea*. I am more doubtful as to the occurrence of two red ones.—G. S. BOULGER.

[Many years ago, when I first found the Blue Pimpernel wild in cornfields at Saunderton, near High Wycombe, I was struck with its very different appearance from the blue-flowered plant which I had seen as a garden weed and had regarded as a mere colour-variation of *A. arvensis*. To the history of the plant as recorded by Mr. Edwards (*l. c.*) should be added the quotation from Miller's *Gardeners Dictionary*, ed. 8 (1768), where he separates it from *A. arvensis* under the old herbal name *A. fœmina*, and says: "The second sort is sometimes found wild in the fields, but is less common than the first in England. This is supposed to be only a variety of the first, but from thirty years cultivating it, I can affirm it never alters, and the plants before they show their flowers are so different, as to be easily distinguished from the first." Should the plants prove distinct, Miller's name would have to be retained, as is done by Mr. Druce (as *femina*) in Fl. Berks. 336, and in his *List*. Pax and Knuth (*Das Pflanzenreich*, iv. 237, p. 322) place Miller's name under the superspecies *A. arvensis*, with the inaccurate reference "Mill. Gard. Dict. ed. 8, i. (1785), 177, n. 2"; it should however appear under their var. *β cærulea*.—JAMES BRITTEN.]

ISLE OF WIGHT PLANTS.—It may be worth recording that *Pinguicula lusitanica* which I have long deemed extinct in the Isle of Wight has been found in a new locality, boggy ground near Bohemia (in Townsend's district iv. (3)). This is some three miles east of the most easterly of the old Isle of Wight habitats, but the eastern limit of the plant in Hants is not extended, as Townsend records the plant as found at Purbrook, which is about nine miles further east than Bohemia. *Sambucus Ebulus*, which I had never seen growing in the island, I found in June this year at Luccombe. I fear that it is extinct in the other recorded localities.—FREDERIC STRATTON.

PRUNELLA LACINIATA IN CAMBRIDGESHIRE.—On June 24 I found this plant growing very sparingly with *P. vulgaris* on pasture land near Cambridge, at an elevation of considerably less than one hundred feet and with a gravelly subsoil. I believe it has not hitherto been noticed nearer than Surrey.—G. GOODE.

OPHRYS MUSCIFERA.—Mr. William A. Miller sends a photograph of a curious variation in *Ophrys muscifera*, in which the bracts were white or very pale green and the sepals pure white; it was found at Downe, near Orpington, Kent.

NOTICES OF BOOKS.

Index Kewensis Plantarum Phanerogamarum Supplementum Tertium Nomina et Synonyma omnium Generum et Specierum ab initio anni MDCCCCI *usque ad finem anni* MDCCCCV *complectens ductu et consilio* D. PRAIN *confecerunt Herbarii Horti Regii Botanici Kewensis Curatores. Oxonii e prelo Clarendoniano* MDCCCCVIII. 4to, pp. 193. Price £1 8s.

WITH commendable promptitude this third Supplement to one of the most indispensable of books makes its appearance. The systematic botanist of the future will wonder—as indeed he of the present is apt to do—how we managed before Mr. Jackson took in hand the most useful of his works and produced in the *Index Kewensis* a monument of industry the value of which, to those who employ it aright, is simply incalculable. This being our conviction, based upon actual and almost daily experience, it will be evident that any criticism or suggestions that this new Supplement may suggest are of no adverse character; it may be taken, indeed, as testimony to the excellence of the work as a whole that only such small points offer themselves for comment.

The most serious defect is the absence of the date, which should follow the reference to the place of publication. By this omission, as we have more than once pointed out, the usefulness of the original *Index* is greatly impaired; the addition would occupy no appreciable expenditure either of time or space, and would greatly increase the value of the references. It should at least have been given when names were published at dates anterior to the years to which this Supplement, judging from the title-page, is confined: indeed, we think it would have been advisable either to reserve these names—the number of which might be greatly extended by reference to a list of such omissions kept in the National Herbarium—for a special supplement, to be issued with Mr. Jackson's still delayed and much needed introduction to the *Index*, or, failing the addition of dates, to indicate them by a prefixed asterisk. The present method is certainly inconvenient and even misleading—out of the nine names under *Cheiranthus*, for example, three are cited from Lowe's *Flora of Madeira* (1857) but there is nothing to indicate to those unacquainted with bibliography that they appeared previous to 1901. The reference to these species as of Buch shows that the papers in this Journal for 1904 on the list printed in Buch's *Physicalische Beschreibung der Canarischen Inseln*, pp. 189–199, has been somewhat insufficiently appreciated by the compilers of the Supplement. In that paper it was shown that the list, though attributed by Lowe to Buch, was compiled (as indeed Buch himself states)

by Robert Brown, and the names in it, if quoted (for many may be neglected as *nomina nuda*), should be cited as of "R. Br. in Buch," &c. Under *Myagrum perenne*, which equally appears in the list, the reference is to "R. Br. ex Britten in Journ. Bot. 1904, 5," thus showing that Brown's connection with it was known to at least one of the compilers. But this again presents difficulties, for the name, if cited at all, should stand as "R. Br. in Buch Canar. Ins. 195 (1825), nomen," and the identification with *Rapistrum rugosum* (see Journ. Bot. *l. c.*) should have been added, whereas at present the species is printed as if it were kept up. Nor is the citation of names consistent; for *Myagrum scabrosum*—which follows *M. perenne* both in Buch and in Journ. Bot. (where it is reduced to *Crambe fruticosa*) and thus stands on exactly the same footing—is omitted from the Supplement.

We do not quite understand the principle on which the reduction of species is effected, or indeed that on which some names appear in the list. For example, we have "Eucalyptus melliodora, *A. Cunn. ex R. T. Baker & H. G. Sm. Research on Eucalypts*, 122." Does this differ from the "E. melliodora, A. Cunn. *ex Schau. in Walp. Rep.* ii. 924" of the original *Index* and of Bentham's *Flora*? If not—and it hardly can—why have we this entry? Mr. Maiden's unfortunate custom of printing synonyms existing in MS. is responsible for certain entries; but is anything gained by their inclusion, or by such resuscitations as "*E. corrugata*, Luehm. ex Diels, in Engl. Jahrb. xxxv. 443, nomen = goniantha?" or by such doubtful reductions as "*E. numerosa*, Maiden, Crit. Rev. Eucalypt. 155 = amygdalina?"? Under *Sherbournia* we have some curious things. Each of the four species is referred to "*Gardneria*," meaning of course *Gardenia*; the first is styled *S. bignoniæfolia* "= *Gardneria bignoniæfolia*," *bignoniæflora* being intended in each case. But in the original *Index*, *G. bignoniæflora* is referred to *Amaralia bignoniæflora*, which is in its turn referred to *Sherbournia foliosa*. "*S. calycina* Hua = *Gardneria calycina*," which is in the *Index* relegated to *S. foliosa*. Such cases of course naturally result from the differing views of the limits of genera and species; but what is to be said of "*S. Zenkeri* Hua = *Gardneria Zenkeri*"? This latter name has not previously been published: unless we can exclude it altogether on the ground of the misprint of *Gardneria* for *Gardenia*, it will have to be quoted, we suppose, as of Prain, as only the Director's name appears on the title-page. Other misprints are not absent, as well as wrong references—*e. g.* *Lopholæna dolichopappa* S. Moore, cited as from this Journal, was published in Bull. Herb. Boiss, 2 sér. iv. 1021. We do not, by the way, understand why the equivalent synonymy is sometimes given in italic and sometimes in Roman letters; we had assumed that the former indicated that the name appeared in the *Index* or Supplements as a synonym, but this is not the case in the instance above cited, where *Senecio dolichopappus* is printed in italics as an equivalent, although that name is also retained in Roman type. We do not understand why, under *Loranthus*,

numerous trivials—*e. g.* Novæ-Britanniæ and Novæ-Guineæ—are adorned with capitals; but we are glad to note that the former practice of spelling the adjectival form of personal names with a small initial has been abandoned. We hope that before long Kew botanists will fall in with the now almost universal custom of omitting the comma between name and authority, and elsewhere: "Loxocalyx ambiguus Makino *in Bot. Mag. Tokyo* xix. 107" is surely preferable to "L. ambiguus, Makino, *in Bot. Mag. Tokyo*, xix. 107."

That from such an undertaking there must be omissions is inevitable; but there are perhaps more of these than might be expected, if the consultation of other periodicals has not been more thorough than that of this Journal. A casual inspection of our volume for 1903 shows the omission of *Indigofera Engleri* Baker fil., and *I. Leprieurii* Baker fil. (names which must stand) and numerous synonyms such as *Xylococcus sericeus*, *Marsea podocephala*, *Crocodilodes seminivea*, *C. subulata*. *Razumovia hispida* (see Journ. Bot. 1901, 69) also finds no place, although the genus, as there pointed out, has priority over *Centranthera*, and is not among the "nomina rejicienda" of the Vienna Rules.*

Criticisms such as these, however, although they may show that this new Supplement might possibly have been more careful in details, are not intended to depreciate its value as a work of reference, as which it is, as we began by saying, indispensable to systematists.

Handbook of Flower Pollination based upon Hermann Müller's Work 'The Fertilisation of Flowers by Insects.' By Dr. Paul Knuth, translated by J. R. Ainsworth Davis, M.A. Volume II.—Observations on Flower Pollination made in Europe and the Arctic Regions: Ranunculaceæ to Stylidieæ. With 210 figures in the text and a portrait of Hermann Müller. 8vo cloth, pp. viii, 703. Oxford: at the Clarendon Press. 1908. Price £1 11*s.* 6*d.*

In our volume for 1906 we noticed the first and introductory portion of this minute and exhaustive record of flower pollination. The volume before us contains the first portion from *Ranunculaceæ* to *Stylidieæ* (the Bentham-Hooker arrangement being followed in the work), containing a full account of all recorded observations on the pollination of flowers in Europe and the Arctic regions, including in less detail observations made in Europe on cultivated species. How extensive the observations have been may be gathered from the fact that the mere list of papers and books consulted occupied nearly two hundred pages of the introductory volume.

---

* The publication of the two genera stands:—
Razumovia Sprengel Mant. Prima Fl. Hal. 45 (1807).
Centranthera R. Brown Prodromus, 438 (1810).
The species so far published under *Razumovia* are:—
R. tranquebarica Spreng. *l. c.*
C. humifusa Wall. List, 3883 (nomen); Benth. in DC. Prodr. x. 525 (1846).
R. hispida Britten in Journ. Bot. 1901, 69, and Illustr. Austral. Plants, 67.
C. hispida R. Br. *l. c.*

In the present instalment are enumerated 504 genera and 1686 species. The observations of course vary greatly in length—some plants are disposed of in three or four lines; others—*e. g. Lotus corniculatus*—occupy as many pages; it is interesting, by the way, to note that for *L. uliginosus* very few insect visitors are recorded. In all the more interesting and important cases a detailed description of the flower—often accompanied by an illustration—is given, followed by a classified list of the visitors recorded, and concluding with general remarks embodying much careful observation.

The work does not lend itself to a detailed notice, which indeed could only be supplied by one who has made a special study of the subject. So many of the observations relate to British plants that we think it would be worth considering, when the book is completed, whether an abridged and consequently much cheaper edition, relating to these alone, might not be issued for the use of British botanists. The work is turned out as well as Clarendon Press books almost always are.

Mosses and Liverworts. An Introduction to their Study, with Hints as to their Collection and Preservation. By T. H. Russell. With illustrations from original microscopical drawings. Pp. xiv, 200. Ten Plates. London: Sampson Low, Marston & Co., Ltd. 1908. Price 4*s.* 6*d.* net.

This book is intended for those who have little or no knowledge of the *Muscineæ*. It is the outcome of the author's intense love of the subject, coupled with his desire to impart its joys to all who will read; and it has been rendered possible by the author's capacity to write in a fluent style, and to express his thoughts in the simplest language. When lecturing to a general audience he has often noticed how much the avoidance of scientific phraseology has been appreciated. Accordingly he has employed, or has coined, English equivalents, which must often strike the moss-student as being needlessly cumbersome substitutes. Thus, "Swan-neck Thyme Thread-moss," in place of the simple and accurate Latin binomial *Mnium hornum*, is a heavy tax to place upon a beginner's memory; but it is only fair to add that the Latin name is always added in an explanatory parenthesis. Again, "fertilizing flower" and "fruit-bearing flower," in place of antheridium and archegonium respectively, seem to be unnecessary innovations. But apart from terminology, the book is a welcome acquisition for nature-students, and is much to be commended. The sketches of the life-history and structure of the mosses and hepatics are so clear, and the author's enthusiasm so infectious, that they are certain to lure numbers of young persons or leisured amateurs to seek a further acquaintance with the bryophytes. The chapter on the collection and preservation of specimens is of the highest value. Not a detail that can in any way aid the student in the way of preparing, examining, and mounting his specimens appears to be omitted. The most appropriate apparatus,

often cheap or home-made, is described. The many pages of instructions for the preparation of microscope-slides, and the numerous hints as to how the many pitfalls that beset the beginner may be avoided, are written with the greatest care and clearness, and will appeal to bryologists generally. The plates are prepared from accurate drawings.

A. G.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on 18th June, Mr. C. H. Wright exhibited specimens of *Melitella pusilla* (Compositæ), a genus described recently by Cav. Sommier, from material collected by him in the island of Gozo, near Malta. Mr. W. C. Worsdell exhibited a large series of seedlings of the Scarlet Runner bean, *Phaseolus multiflorus*, exhibiting artificial fasciation induced by cutting away the plumule early in its growth. A paper on the altitude and distribution of plants in Southern Mexico, by Dr. Hans Gadow, F.R.S., was communicated by Dr. A. B. Rendle in the absence of the author in Mexico. Dr. Stapf read a paper on *Gardenia Thunbergia* and its allies, by himself and Mr. J. Hutchinson. These Gardenias, fifteen in number, form the bulk of the section *Eu-Gardenia* in Africa, and extend over the whole of the Continent with the exception of the temperate north. Owing to the instability of certain characters and the scantiness of the material in the older collections, they have not been well discriminated so far, with the result that *Gardenia Thunbergia* came to cover finally half-a-dozen of perfectly distinct species ranging all over Africa, whilst the plant originally described under that name is actually confined to a limited area in South Africa. The distinctive characters of the species admitted—of which six are here described for the first time—are set out in key form, whilst their distribution and synonymy and full descriptions of the new species are given in the second part of the paper. It is also pointed out that the segregation of the "*Thunbergia*" group from the closely allied Indo-Malayan stock of § *Eu-Gardenia* must have taken place in pre-Tertiary times.

The Mycological Society continues with unflagging zeal its task of encouraging and developing the study of systematic Mycology in this country, and the recently issued *Transactions* record its activity during 1907. At the annual foray held at Newcastle in the beginning of October, after several weeks of drought had followed a cold wet summer, the climatic conditions for a good fungus harvest were as unfavourable as could well be imagined; but by diligent collecting two hundred and eighty-five species were obtained, including two new to the British Flora—*Hygrophorus discoxanthus* Rea and *Marssonia Delastrei* Sacc. A full account of the foray and of the species collected occupies the first place in the *Transactions*, a knowledge of the general distribution of fungi throughout the country being rightly held as one of the chief aims of the Society. The Presidential Address by Miss A.

Lorrain Smith deals with the history of microfungi in this country from the earliest records and drawings by Hooke in his *Micrographia* (1677) down to the present day. Dr. M. C. Cooke replies to M. Boudier's criticisms of his 'Illustrations,' published in a previous number. Mr. A. D. Cotton gives further notes on British *Clavariæ*, a record of careful and critical work. Dr. Plowright writes an interesting account of the poisoning case reported at Ipswich last autumn, due to eating *Amanita phalloides*, one of our most fatal species. Such cases are rare in this country, where the bulk of the people eschew fungi altogether, or confine themselves exclusively to the edible mushroom. The list of new or rare British fungi is prepared by Miss Smith and Mr. Carleton Rea, and contains several species new to science. The genera recognized for the first time in Britain are *Hormodendron*, *Gonatorhodiella*, *Pseudophacidium*, *Cudoniella*, *Meliola*, and *Curreyella*; for the beautiful coloured plates the Society is again indebted to Mrs. Rea.

At the installation of Lord Morley as Chancellor of Manchester University on July 9, the honorary degree of Doctor of Science was conferred by him upon our correspondent Mr. J. Cosmo Melvill, who, it will be remembered, in 1904 generously presented his herbarium to the University Museum. In presenting Mr. Melvill to the Chancellor, Professor Lamb, Dean of the Faculty of Science, said: "The claims of natural history are no new theme in this University, nor are we ever slow in honouring them. When the traveller approaches our abode the first building which he encounters is the museum, and if he explores a little further he finds himself in the stately palace devoted to the study of biology. If he ransacks the treasures of that museum, which is our chiefest ostentation, he will discover how much it owes to the constant affection and generosity of James Cosmo Melvill. It is chronicled of Solomon that he spake of trees, from the cedar that is in Lebanon even unto the hyssop that springeth out of the wall. It is not recorded that he also knew by heart all the shells of the ocean, from the Arctic Circle to the Persian Gulf. That double weight of learning was reserved for the accomplished systematist who stands before you. Those who have worked with him will testify with what gracious modesty he sustains it. It is said that you may bring to him a shell from almost any sea or any strand; he will inspect it with an indulgent smile; he will tenderly convey to you that it is, alas, not new to science; and if you are so rash as to doubt his verdict he will indicate the particular compartment of the particular cabinet in the particular collection where a much more beautiful and perfect specimen is enshrined."

"The Origin and Present Distribution of the British Flora" is the subject of an interesting paper by the Rev. George Henslow in *The Journal of the Royal Horticultural Society* for June.

The *Report of the Botanical Exchange Club for 1907*, edited by the Rev. H. J. Riddelsdell, the distributor for the year, has been issued by Messrs. Parker & Son, Oxford, price 2*s*. We hope to give some extracts from it later.

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Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

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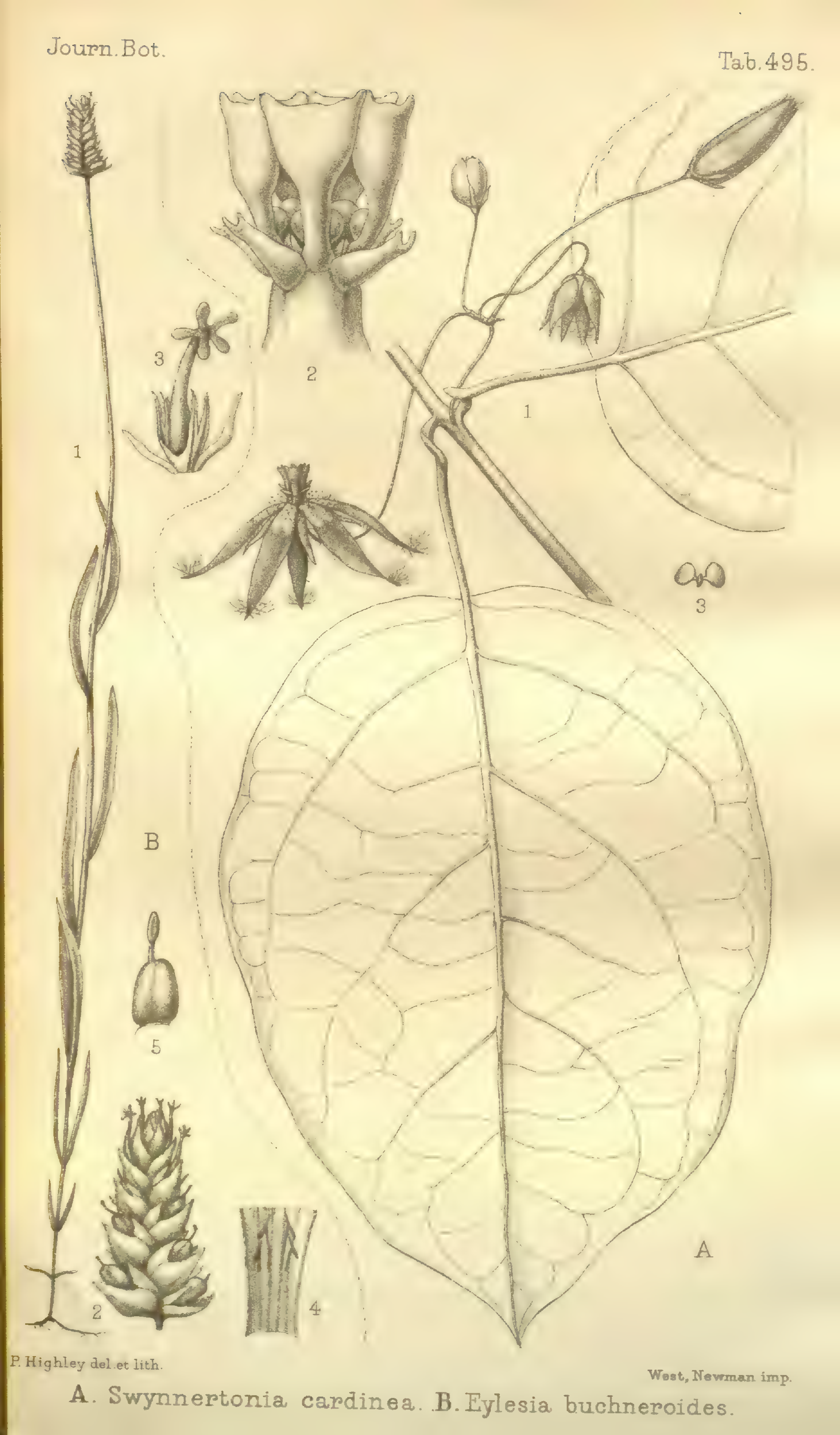

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SAGITTARIA HETEROPHYLLA Pursh IN DEVON.

By W. P. Hiern, M.A., F.R.S.

(Plate 494.)

In the river Exe, in and near Exeter, I found in July of the present year, in considerable quantities, a plant with its handsome foliage much resembling that of *Alisma Plantago-aquatica*, but with its inflorescence quite inconsistent with that genus, and yet certainly belonging to the family *Alismataceæ*.

After careful examination it was ascertained that the plant was diœcious or monœcious, that the stamens of the male flowers were numerous, that the carpels of the female flowers were distinct and very numerous with the ovules solitary in the ovaries, and that the flowers were mostly arranged in whorls of three. The plant therefore belongs to the genus *Sagittaria*, though it is sufficiently different in appearance from the British species *S. sagittifolia* L.; the leaves are not at all arrow-shaped, the inner segments of the perianth are without a dark violet patch of colour at the claw, and the flowering-scapes fall short of the foliage.

The following is a detailed description, taken from fresh or living specimens, as they grew in the running waters of the river Exe.

A perennial herb, aquatic, partly or in its early stages wholly immersed, erect, succulent, rigid, glabrous, rather glossy, acaulescent, stoloniferous, gregarious, monœcious or diœcious, densely leafy at the base, rooting in the mud, 3–9 dm. high; rootstock thick, densely fibrous at the base, with numerous whitish rather thick fibres and long and thinner branched fibrils; stolons frequent, terete, more or less horizontal, ranging up to 5 dm. long and 2 mm. in diameter; leaves numerous, radical, erect or suberect, some of them attaining the full height of the plant, a few of them sometimes sublinear and reduced to the form of phyllodes; petioles firm, brittle, sappy, spongy within, longitudinally veined and more or less marked with slender transverse dark lines, above somewhat tapering triangular and more or less 3-winged, below rounded turgid and narrowly keeled at the back, laterally 2-winged especially towards the base, imbricate and clasping so as together to form at the base a close tuft 3–10 cm. in diameter, somewhat diverging above, ranging up to 7½ dm. long or rather more; lamina of the fully-developed leaves oval or very slightly ovate, obtusely pointed at the apex, rounded or nearly so at the base, quite entire and not at all sagittate, succulent-membranous, not wavy, slightly concave towards the base, 1–1¾ dm. long, ½–1 dm. broad; midrib strongly pronounced, in relief on both faces especially beneath; lateral veins 4 or 5 on each side of the midrib, proceeding at or near to the base of the midrib to or towards the margin of the leaf, the outer ones gradually weaker; transverse nerves numerous, oblique, very weak; scapes comparatively few,

erect or ascending, nearly straight or sinuous, or at the lower verticil geniculate, at length decumbent, shorter than the leaves, ranging up to 5 dm. high, tough, about 3–4 mm. in diameter at the base, triquetrous-terete below, trigonous above, somewhat tapering upwards; inflorescence centripetal, verticillate-racemose, simple or rarely a little compound; pedicels mostly arranged in 1–3 whorls, three together on the upper part of the scape, erect-patent, subterete, green or sometimes rosy-purplish, moderately slender, ranging up to 12 mm. long or rarely up to 18 mm. long, those of the female flowers very short, the terminal one solitary and erect, bracteate at the base; the upper verticils of the monœcious scapes usually male, and the lower ones female; occasionally a verticil is partly female and partly male; bracts 3, broadly ovate, subscarious, obtuse and slightly thickened at the apex, connate at the base or occasionally two of them connate higher up, about 6 mm. long; outer segments of the perianth 3, broadly ovate, obtusely pointed at the somewhat thickened apex, green, foliaceous, concave, imbricate in the bud, not bracteolate at the base, comparatively persistent, about 8 mm. long; inner segments of the perianth 3, subrotund, scarcely clawed at the base, conspicuous, white, or at the base very slightly yellowish, membranous, imbricate in the bud, marked with several slender somewhat branched veins from the base diverging towards the upper margin, concave, fugacious, ranging up to 10–13 mm. long and broad, those of the later flowers of the same sex usually rather smaller than the earlier ones, and those of the female flowers rather larger than the contemporaneous male ones; stamens of the male flowers numerous, about 30 more or less, straight, pale-gold in colour, $2\frac{1}{2}$–3 mm. long; filaments dilated, somewhat or scarcely compressed, glandular-hispidulous, $1\frac{1}{4}$–$1\frac{1}{2}$ mm. long, oval, contracted at the apex into a very short glabrous neck; anthers equally 2-celled, glabrous, $1\frac{1}{4}$–$1\frac{1}{2}$ mm. long, the cells oval-oblong, parallel, deep-gold in colour at the outer margin at the time of dehiscence; pollen copious, pale-gold in colour, the grains $\frac{1}{44}$–$\frac{1}{30}$ mm. in diameter, spherical-polyhedral, the facets bluntly polygonal, punctulate. Carpels of the female flowers very numerous, crowded on the hemispherical receptacle, beaked at the apex, about $1\frac{1}{2}$ mm. long including the beak, glabrous or slightly glandular, subcompressed, obliquely ovate, crested on the back, narrowly winged on the margin; beak at the time of the flower stout, curved, suberect, about as long as the rest of the young carpel, obtuse, cleft or toothed at the obtuse stigmatic apex; ovule solitary, basilar, erect; fruit echinate.

Among a large number of specimens examined, all the leaves were of one and the same pattern, in so far that none were at all lobed, but with a single exception, in which case one leaf was unequal at the base, and on the broader side not far from the base there was produced a patent-deflected blunt, ovate-oblong, tooth-like lobe, measuring about 9 mm. long, and 6 mm. broad.

On the surface of the lower part of the clasping petioles some adpressed scales were observed to occur in several instances; these

scales are oval, somewhat compressed, measure about 3–4 mm. long, and 2-3 mm. broad, and are arranged not all in the same longitudinal row. Perhaps they represent the intra-vaginal squamules noted by Buchenau in Engler, Bot. Jahrb. ii. p. 467 (1882), and stated by Jared G. Smith, in *Missouri Botanical Garden, Sixth Annual Report*, p. 29, to occur on the petioles of *Sagittaria latifolia* Willd., and probably to be found in the case of other species.

In one exceptional case a hermaphrodite flower was observed.

In diœcious specimens the female plant has its scape usually rather shorter than the scape of the male plant, and the flowers are arranged in only one, or in very few verticils; in monœcious specimens the scape usually has the upper verticils male and the lower ones female. The early-flowering specimens appear to be more frequently diœcious, and the later ones monœcious.

Cattle do not seem to eat the leaves of the plants left dry as the water recedes during the hot weather; they only trample them in reaching the river to drink.

Our specimens I consider to constitute a variety of the North American species, *Sagittaria heterophylla* Pursh; the references and synonymy are as follows:—

SAGITTARIA HETEROPHYLLA Pursh, Flora Americæ Sept. (ii.), p. 396, n. 6 (1814); [J. E. Smith in] Rees, Cyclopædia, xxxi. art. *Sagittaria*, n. 7 (1815); L. C. Beck, Botany of the Northern and Midland States, p. 377 (1833); W. Darlington, Flora Cestrica, p. 529 (1837); K. S. Kunth, Enumeratio Plantarum, iii. p. 158 (1841); G. Engelmann in Asa Gray, Man. Bot. North. Un. St. ed. 2, p. 439 (1856); M. Micheli in Alph. et Cas. DC. Monogr. Phaneg. iii. p. 71, n. 4 (1881); D. Macoun, Cat. Canad. Pl. iv. p. 78, n. 2420 (1888); not of Schreber; not of Bertero.

S. rigida Pursh, same work, p. 397, n. 8; J. Sims, Bot. Mag. n. 1632, with plate (1814); [J. E. Smith in] Rees, same article, n. 12; Jared G. Smith, Ann. Rep. Missouri Bot. Gard. vi. p. 49, plate 18 (1895); N. L. Britton & A. Brown, Ill. Fl. i. p. 90, n. 9, fig. 201 (1896); Buchenau in Pflanzenreich, iv. 15, pp. 44, 45, fig. 13, M, N (1903).

S. bulbosa Donn, Hort. Cantabr, ed. 6, p. 246 (1811), name only; quoted by J. Sims and others.

S. sagittifolia var. 3, *angustifolia* W. J. Hooker, Fl. Bor. Amer. ii. p. 167 (May, 1841), in part.

S. sagittifolia var. *rigida* Torrey, Fl. St. New York, ii. p. 259 (1843).

S. heterophylla var. *rigida* G. Engelmann, same reference as above.

S. heterophylla var. *angustifolia* G. Engelmann, same reference.

S. heterophylla var. *elliptica* G. Engelmann, same reference.

The distribution in North America is from Quebec to Minnesota, westwards to Minnesota and Nebraska, and southwards to New Jersey, Tennessee, Missouri, and Nebraska; it grows both in stagnant and running waters.

The autumnal tubers are edible.

In the account of the plant given in the *Botanical Magazine*, accompanying the plate quoted above, it was stated that the species increases very fast by runners, insomuch that in a short time it had overrun the aquarium in Mr. Vere's garden at Kensington Gore. It had been introduced from Canada by Sir Joseph Banks, who received it from Francis Masson in 1806; the latter died in Canada in 1805. James Donn gave the year 1798 for the date of introduction of his *Sagittaria bulbosa*, which is also Canadian, and is now considered the same species. During recent years there is no record of the species establishing itself within the limits of our flora, nor even of its casual occurrence; and the name is not found in the Kew *Handlist of Herbaceous Plants*, second edition (1902). In that list only three species are given, namely, *S. natans* Michx., *S. sagittifolia* L., and *S. variabilis* Engelm.

As to American species that have been introduced into Europe, it may suffice to mention that *S. lancifolia* was figured in the *Botanical Magazine*, n. 1792, in 1816; also that on December 4th, 1884, Thiselton-Dyer exhibited at the Linnean Society examples of leaves of *S. montevidensis* Cham., from seeds collected in Chili and raised at Kew in 1883. It also appears, according to Coste, Fl. France, iii. p. 292, n. 3349 (1906), that *S. obtusa* Willd., which is a diœcious form of *S. latifolia* Willd., has long been naturalized in France in soft mud and deep ditches, by the banks of the Garonne and Dordogne rivers, in the neighbourhood of Bordeaux, where, however, only the male plants have been observed.

Among recent authors it is agreed that Pursh's two species, namely his n. 6, *S. heterophylla*, and his n. 8, *S. rigida*, are really forms of the same, and must be united. The first author to unite them was Dr. George Engelmann, who has made a life-long study of the family *Alismataceæ*; he united them in 1856, as above quoted, and he adopted the former of these two names for the combination. Micheli, in his Monograph, followed the same course in 1881, as also did Macoun in his *Catalogue of Canadian Plants* in 1888.

On the other hand, Jared G. Smith in his work quoted above, and Buchenau, also Britton & Brown, have all preferred to use *S. rigida* Pursh for the name of the united species; but these cases are subsequent to 1856.

According to the International Rules for botanical nomenclature, adopted at Vienna in 1905, the correct name for use under the circumstances is *S. heterophylla* Pursh; this decision is governed by Article 46 of the Code, which is as follows:—"When two or more groups of the same nature are united, the name of the oldest is retained. If the names are of the same date, the author chooses, and his choice cannot be modified by subsequent authors."

There are two other plants which have also received the name *S. heterophylla*, one of them being older than that of Pursh, but neither of them now stands; these are *S. heterophylla* Schreb. in

Schweigger & Körte, Fl. Erlang. ii. p. 119 (1811), which has been reduced to *S. sagittifolia* L. var. *heterophylla* Bolle; and *S. heterophylla* Berter. Herb. n. 597, which is *S. incrassata* Steud. Nomencl. Bot. ed. 2, ii. p. 491 (1841), a Chilian plant which is known only by name; Bertero, who was born in 1789, died at sea, between Tahiti and Chili, in 1831.

It is on record that Pursh brought home from North America no specimen from which to frame the character of his *Sagittaria rigida*, but had only a short and imperfect description taken at the time of observing the plant; it represented a form grown in the still water of the Oswego River, near the great falls, where the river was more than seven feet in depth; it had narrowly lanceolate and rigid leaves narrowed at each end, strong and stiff petioles, branched scapes, and very numerous monœcious flowers.

Jared G. Smith, in the work quoted above, thus remarks on the species:—"Specimens differ greatly in size and form of leaf, differences depending largely on the habitat of the plant. When growing in deep pools or running streams, the petioles become thick, rigid and elongated, with long narrowly lanceolate spongy blades, or the tapering attenuate phyllodia are bladeless. This is the *S. heterophylla rigida* of the manuals and collectors. When growing in shallow ponds or in simply muddy places, the petioles are weaker, and the blade elliptical ovate and usually smaller, and the habit erect or ascending. This form is the *S. heterophylla elliptica* of collectors. Depauperate plants from shallow water or simply muddy places, with linear elliptical oblong leaves, are the *S. heterophylla angustifolia* of collectors. Toward the southern limit of its range, the plants are usually of ranker growth, with larger more often hastately lobed leaves. In all these conditions there is much variation in form and size of achenium, stamen length, and in the size of the fruiting-head. They occur together throughout the range and seem to be the result of different habitat, rather than to mark distinct forms or varieties."

Our specimens do not accord well with the type of the species *Sagittaria heterophylla* Pursh, nor precisely with any of the varieties mentioned in the synonymy above given; they may conveniently be treated as constituting a new variety or local form, which I call *iscana*, and which I briefly characterize thus:—

Var. ISCANA; diœcia vel monœca rigida, foliis ovalibus integerrimis haud hastatis apice obtuse contractis basi in maturitate rotundis, petiolo firmo fragili.

The microscopic appearances and dimensions of the pollen were obtained by means of an apochromatic one-eighth and a Reichert one-fifteenth immersion, with the eye-piece micrometer. Towards the results I have been assisted by Mr. F. R. Brokenshire, of Exeter, who kindly placed his instrument, appliances, and experience at my disposal for the purpose.

Explanation of Plate 494.

1. Whole plant of *Sagittaria heterophylla* var. *iscana*, with stolons, a small specimen, reduced by about a third. 2. Portion of an inflorescence, natural size. 3. Stamen, enlarged about 10 diameters. 4. Young carpels, enlarged about 10 diameters. 5. Stamen of *S. sagittifolia*, for contrast, enlarged about 10 diameters. 6. Carpel of *S. sagittifolia*, for contrast, enlarged about 10 diameters. 7. Portion of the lower part of an exceptional and unique leaf of *S. heterophylla* var. *iscana*, showing a small lobe, natural size.

THE GENUS *ROSA* IN THE 'LONDON CATALOGUE,' ED. 10.

By W. Barclay.

Perhaps the Editor of the *Journal of Botany* will kindly give space to a few notes on some of the species of *Rosa* as given in the new edition of the *London Catalogue*.

R. hibernica Sm. and *R. involuta* Sm. The hybrid nature of these two roses seems still doubtful to the authors, as it is merely suggested in brackets and with a mark of interrogation. Strange to say, there is no such mark at the kindred hybrid *Eglanteria* × *spinossisima*. Surely those who accept the latter as a hybrid should equally accept the two former?

R. pomifera J. Herrm. The evidence that the plant is native to England given by Mr. Ley (Journ. Bot. 1907, 204) seems of very little account in the case of a plant which has been so long in cultivation.

R. mollis Sm. var. *recondita* Puget. If this plant really occurs in fifteen counties of Britain, it ought surely to have been given as a variety of *R. pomifera*, in accordance with the views of Continental authorities, who should certainly be the best judges. If the occurrence of this variety, which is the one nearest to the type of Herrmann, could be proved, it would greatly strengthen the case for the type being also native.

R. omissa Déségl. and its three vars. b, c, and d. The variety d. *pseudo-rubiginosa* Lej., which, as Mr. Ley states in his paper, is identical with *arduennensis* Crép., is not a variety of *omissa* but of *mollis*. Crépin gives it as such in *Tableau Analytique des Roses Europ.*, p. 12, and he could not possibly by mistaken. Its sepals are truly persistent and do not disarticulate as do those of *R. omissa* Déségl. and its varieties.

With regard to the species itself and its variety b. *resinosoides* Crép., the former said to occur in eighteen and the latter in thirty-two counties, it is truly strange that roses so widely spread seem never before to have been recognised by any competent observer. In 1894, in his paper "Sur la Nécessité d'une Nouvelle Monographie des Roses de l'Angleterre," Crépin says, p. 10, "Up to the present this species does not appear to have been established as occurring in the British Isles, where moreover it does not seem to exist."

As to c. *sub-mollis* Ley, which is said in the paper to be very

near *R. mollis*, I cannot see how that can be when in the description of it I am told that it has "strong arching surculi; thorns shorter and rather more curved; fruit later in ripening; the sepals sub-erect and persistent till the fruit has changed colour, but finally caducous." No rose like that is very near *R. mollis*, even though the prickles be "equally narrow-based."

R. suberecta Ley is said in Mr. Ley's paper to be identical with *R. villosa* d. *suberecta* Woods. Woods described his rose as a variety of *R. villosa* L., that is, *R. mollis* Sm. Mr. Baker also gives it, in his monograph, as a variety of *R. mollis* Sm. Woods's description is certainly indefinite, and, if I remember rightly, his type specimen is too young for absolute certainty, but how Mr. Ley could draw up his description from either is a mystery to me. His *suberecta* seems to include a number of variations with globose fruit and some parts more or less stained with vinous red. If Mr. Ley thinks that this staining is confined to his *suberecta*, he is sadly mistaken.

Mr. Ley mentions what he calls an albino form found in Scotland with flowers white with purplish spot, as if this were something as rare as a white blackbird. The truth is that in Central and Northern Scotland both *mollis* and *tomentosa*, with flowers white but tinged with pink on the outside of two or three petals, are not at all uncommon. When full-blown they appear entirely white. The *tomentosa* forms belong to different variations and certainly have not all globose fruit.

R. suberecta Ley b. *glabrata* Ley. This form of the West of Scotland cannot be united, as is done by Mr. Ley, with the Scandinavian var. *glabrata* of Fries. Scheutz made a mistake, as was conclusively proved by Mr. Symers Macvicar, in making the Scottish rose to be a form of *R. mollis* Sm., and now Mr. Ley makes the opposite mistake of making the Norwegian rose to be a form of *tomentosa*. Var. *glabrata* Fr. has its sepals quite erect and truly persistent, not disarticulating on the ripe fruit. It occurs with both red and white flowers. Authentic specimens from Norway leave no doubt as to what Fries's rose really is.

R. Andrezeiovii Steven. What Steven's plant really was seems to be quite uncertain. Some authors, like Mr. Ley, consider it as a *tomentosa* form. R. Keller in Aschers. & Graebn. Syn. gives it as a variety of *R. mollis* Sm. Crépin at one time also thought it belonged to *R. mollis*, but after seeing the type specimens in Besser's herbarium he determined it to be a hybrid of the *involuta* group (Bull. Herb. Boiss. i. 8, and *Rosæ hybridæ* 48). Moreover, Mr. Ley's description does not agree with that given in his reference, for while Mr. Ley says "thorns falcate, normally very large," Besser says, "aculeis subulatis, rectis." And, again, Mr. Ley says, "leaflets broadly elliptic," while Besser says "foliolis ovatis, acutis"!

R. cinerascens Dum. This is quite wrongly described as having "sepals spreading and caducous before the ripening of the fruit." There is an evident mistake in Mr. Ley's reference, but Dumortier in his *Monographie des Roses de la Flore Belge* (1867) describes his

rose as having "sepals of the fruit persistent, erect"! Afterwards in a note he qualifies this by saying "sepals divergent, persistent to the maturity of the fruit," which means that they are sub-erect or erect-spreading and sub-persistent. Mr. Ley has fallen into another mistake in saying "thorns falcate," whilst Dumortier says "almost straight."

R. obovata Ley—Mr. Baker's *R. tomentosa* Sm. var. *obovata*. Of this and the other two forms described as having uncinate prickles I know nothing, having never seen any *tomentosa* form with uncinate prickles, but I would direct Mr. Ley's attention to a remark of Crépin (Journ. Bot. 1896, 215) where he says that var. *obovata* Baker "appartient incontestablement au groupe 5" (of *coriifolia* Fr.).

It is a small matter, but may I ask why Mr. Ley calls "thorns" what all botanists before him call "prickles"?

[The Editor has kindly sent me a proof of Mr. Barclay's notes, and has suggested that I might like to make some comments. Being just now in the north of Scotland, away from books and specimens, I can do so but briefly.

R. hibernica. I believe the original Irish plant to be *coriifolia* × *spinosissima*; the varieties include plants of which *glauca* and *canina* forms are parents. The mark of interrogation is, no doubt, superfluous here; but hardly so in the case of the plants arranged under *R. involuta*, which perhaps include hybrids of *spinosissima* with members of one or more sections besides the *Tomentosæ* (e.g. *Eglanteria* and *tomentella*).

R. pomifera. The garden form differs considerably in appearance from the wild one, and sometimes occurs as an escape (I have such a specimen, collected by Mr. G. Nicholson in Co. Wicklow); but that is no valid obstacle to the species growing as a native in Britain, and I believe that Mr. Ley is right in his opinion. It is a Scandinavian plant, and quite likely to be British.

R. mollis var. *recondita*. Mr. Ley (Journ. Bot., May, 1907) gives reasons for joining this with *mollis*, rather than with *pomifera*; "petals not ciliate" seems rather a strong argument.

R. resinosoides. Unless my memory is at fault, this was recorded by Mr. Druce from Scotland a good many years ago, on the faith of specimens determined by Prof. Crépin himself.* If the variety occurs with us, why should not the type of *R. omissa*? M. Crépin's adverse opinion is, evidently, not decisive.—Edward S. Marshall.]

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* [This is recorded by Mr. Druce in Ann. Scott. Nat. Hist. 1893, 250, from near Lawers in mid-Perth; Mr. Druce informs us that the plant was determined by Crépin—a fact which is not mentioned in the published note.—Ed. Journ. Bot.]

NOTES ON 'THE LONDON CATALOGUE,' ED. 10.

By the Rev. E. S. Marshall, M.A., F.L.S.

In the interval since the appearance of this new edition I have received some valuable information, particularly from Messrs. Beeby and F. N. Williams. The heaviest part of the work had already been carried through by Mr. W. A. Clarke, before I became responsible; indeed, his draft might almost have been printed as it stood. My own task was somewhat needlessly hurried, as it was hoped that the *Catalogue* might be ready for issue by Christmas; but, owing to causes beyond my control, there was a delay of about two months. This had the advantage of enabling us to make several corrections; even now there are some unfortunate omissions, for which I must, as a rule, be held responsible. Some of the points dealt with below were raised in the notice on pp. 124–131 of this Journal for April.

During the final proof-reading we were indebted for some improvements to Mr. Druce's *List*, which I have found very useful in the preparation of this paper. As it was published earlier, the authority will, as a rule, be Druce, in cases where the varietal names coincide.

The greatest *crux*, as was inevitable under existing circumstances, arose in connection with nomenclature. Mr. Clarke and I did our best; but neither of us has any claim to be an expert. Speaking entirely for myself, I may say that I generally accept the Vienna code, although it is in some respects inconsistent, if not contradictory. The adoption of several names in the *Catalogue* was "against my own personal preference," not because they accord with this code, but because they are old aggregates of doubtful or mixed application—"spurious antiques," in fact, as one of my correspondents has happily put it. The *Catalogue*-number is refixed to the subjoined comments, as that seems to be the most practical plan.

32. Ranunculus acris L. Var. *pumilus* Wahlenb. was accidentally left out.

41. Caltha radicans Forst. Var. *zetlandica* Beeby is dropped, having been withdrawn by its author. *C. palustris* L. c. *minor* is of DC. *Prodromus* i. 44 (1824), who expressly says: "in Anglia præcipue adhucdum reperta." It is occasionally somewhat nodal-rooting.

56. Papaver somniferum L. Well established in cultivated ground in Cambs., Kent, and Sussex; I have also seen it plentifully in bushy places on the chalk above Shoreham, W. Kent, so that its claim to be naturalised is unquestionable. Of the other poppies, *P. dubium* L. may possibly be a true native, though I doubt it.

70. Fumaria occidentalis Pugsl. Mr. Pugsley writes that this should have been placed between *Bastardi* and *officinalis*. He revised the census-numbers of the group *Capreolatæ*, only

counting those vice-counties from which he had seen specimens. It is probable that most, if not all of this group are to some extent native (Mr. Pugsley agrees). I should have felt disposed to star the section *Officinales*; but Rev. R. P. Murray in *Fl. Somerset* mentions that seeds of *F. officinalis* occur in pre-glacial deposits, so they were given the benefit of the doubt.

94. Arabis hirsuta Scop. c. Retziana (Beurling). A plant somewhat resembling *A. ciliata* var. *hispida* was found several years ago by Mr. Shoolbred and myself on the sandhills at Newton Nottage, v.-c. 41 Glamorgan; and specimens sent by Mr. Townsend to M. Rouy were determined as *A. Retziana* Beurling, var. *hispida*. I have similar forms from W. Sutherland, N. Uist, Coll, and Tiree; so it is probably not very rare. I have not seen Beurling's description, but believe it to be a subspecies of *A. hirsuta*. Mr. Druce gives Koch as the author of *A. ciliata* var. *hispida*; but the continental species is (*fide* Rouy) *A. arcuata* Shuttleworth, true *A. ciliata* being apparently confined to the British Isles.

Sisymbrium polyceratium L. is omitted; it has long been extinct at Bury St. Edmunds, and only occurs elsewhere as a casual, I believe.

135. Brassica Rapa L. It would have been better to write a. *sylvestris* Wats. as representing the type; this is a native, and doubtless the original form of the species. I consider c. *Briggsii* to be indigenous in some of its stations.

145. Capsella Bursa-pastoris Medic. Our named "varieties" are not satisfactory; var. *cuneata* Mott may be an exception, as it frequently occurs in poor sandy ground, abundant and characteristic. I am satisfied that the species is native.

174. Viola odorata L. b. imberbis Leight. I do not know this; it is not, I fancy, identical with the forma *alba* (Lange) of ed. 9. Our white-flowered sweet violet is locally abundant and well-marked in several counties.

180. V. canina L. The application of such an indefinite name to a critical species like *V. ericetorum* Schrad. is of very questionable advantage.

206. Silene anglica L. b. quinquevulnera (L.). I have recent specimens from a chalk-down in the south of England, where it appears to be truly wild. Mr. Druce keeps it up as a full species, and I incline to agree with him.

211. S. italica Pers. Syme apparently thought this native near Dartford, and Mr. Williams accepts it as such from near Hythe, E. Kent; but the distinctly southern distribution in Europe is adverse. Some of the reputed stations belong to *S. dubia* Herbich, which seems to me quite distinct from *S. nutans* L.; their area coincides in E. Kent, the latter being a much coarser plant.

225. Cerastium vulgatum L. d. fontanum (Baumg.). Rouy and Foucaud, *Fl. de France* iii. 207–8, identify Baumgarten's

plant (treated by them as a "forme" or race) with both *C. triviale* var. *alpinum* and *C. longirostre* Wichura; I believe, correctly.

234. STELLARIA APETALA Ucria (1796) = S. BORÆANA Jord. (1852). Schinz and Thellung keep this up as a species, which I have long thought advisable; Mr. Williams agrees, though he has not actually compared Sicilian specimens with British *apetala*. The plant is not rare, at least in the south of England; but it flowers early and soon withers, so that it is apt to be overlooked.

240. ARENARIA VERNA L. b. GERARDI. Mr. Williams remarks that "*Arenaria* Benth. & Hook. is a horrible mixture, and includes several distinct genera. All European floras (the British excepted) keep *Alsine* distinct from *Arenaria*;" also that Wahlenberg's plant was published as *Alsine Gerardi*. I think that under *Arenaria* it must be called var. *Gerardi* Hook. fil. (*Student's Flora*).

251. A. SEDOIDES. "Froelich described this as *Alsine sedoides* in Koch *Syn. Fl. Germ.* 114 (1835). This is, however, not a British plant, but is *Alsine verna* var. *decandra* Gürke in Richter, *Fl. Europ.* ii. 256 (1899). The British plant you mean is *Alsine sedoides* Kittel (1844). To those who keep up *Arenaria* in its comprehensive sense the authority will then be G. C. Druce" (Williams *in litt.*).

262. SPERGULA ARVENSIS L. Insert "agg." before the census-number. In some districts, notably in N. Scotland, *S. sativa* appears to be the only representative of the superspecies.

279. HYPERICUM CALYCINUM L. I am familiar with this as occurring about Box Hill; but it does not appear to be strictly naturalised—*i.e.* reproducing itself from seed. It is, I think, always planted, and spreads by root-extension only. A parallel case is that of *Vinca major*, which has somewhat inconsistently been starred, and ought to have been printed in italics.

308. GERANIUM SANGUINEUM L. var. PROSTRATUM (Cav.) was omitted, having been reckoned as synonymous with *lancastriense*; but this can hardly be correct, because *lancastriense* seems to be confined (as a native) to Walney Island.

320. G. LUCIDUM L. b. RAII (Lindl.) is expunged; no specimen appears to exist, and a maritime form of *G. Robertianum* may have been intended.

323. E. MOSCHATUM L'Herit. b. MINOR Rouy (*Fl. France* iv. 113). I do not know to whom we owe this addition; the description fits a small plant found by me on mountain limestone at Purn Hill, Bleadon, N. Somerset, and apparently by Briggs near Plymouth; it flowers quite early. "Plante de 8–12 centimètres, très réduite dans toutes ses parties; feuilles à segments petits (3–4 fois plus petits que dans le type), ordinairement profondément incisés ou subpinnatifides; pédoncules 2–4-flores, plus courts que la feuille; bec du fruit bien plus grêle, mais de même longueur . . . ça et là dans les pelouses maritimes rases."

326–7. The application of the name *Oxalis stricta* L. to a

prostrate species is palpably absurd, and I agree with Mr. Druce's rejection of Mr. Robinson's conclusions. *O. corniculata* (in the received sense) is, I understand, considered by Rev. W. Moyle Rogers to be native in Cornwall, and should at least be starred.

347. Ononis spinosa L. b. mitis (Mill.) is Mr. Druce's (no doubt correct) citation.

350. Medicago sativa L. is well established on the sandhills at Burnham, N. Somerset, and I believe in a good many other stations.

382. Trifolium procumbens Sibth. Add b. majus Koch; a marked and handsome variety, beyond a doubt native near the Lizard, W. Cornwall.

385. Anthyllis Vulneraria L. b. coccinea L. Under this name two distinct plants are confounded; one has the flowers entirely red (var. *coccinea* L.), and is rare in Britain; I have collected it on cliffs near Bigbury, S. Devon, and received it fresh from Ben Lawers (*legit* C. P. Hurst). The other is much more frequent on our coasts, ranging from E. Sussex to W. Sutherland!; a small distinct-looking form, with cream-coloured, red-tipped flowers. It may be either γ *rubriflora* DC. *Prodr.* ii. 170 (*A. Dillenii* Schultes), which Koch describes thus:—"vexillum, margo alarum carinaque sanguinea," or more probably ζ *polyphylla* DC., said by Koch to be "antecedenti valde similis, sed flores ochroleuci cum apice vexilli sanguineo" (*Syn. Pl. Germ.* ed. 2. 175).

410. Vicia hybrida L. I have received from a friend a specimen of this, gathered last year on a chalk down in a southern county, remote from houses, and associated only with native species; it may have been equally indigenous at Glastonbury Tor., so that it is not starred in the present edition. I have found it as a casual in E. Kent, and it has been reported from the Isle of Wight.

425. Lathyrus montanus Bernh. b. tenuifolius. Apparently this should stand as of Druce, Roth having described it as a species under *Orobus*. Rouy ranks it (*l.c.* v. 271) as a 'forme'—between a subspecies and a variety—under the name of *L. Rothii* Rouy, with β *tenuissimus* Rouy, which more truly represents our *tenuifolius*, but is only the extreme of a series, graduating into the type.

434. Spiræa Ulmaria L. b. denudata Boenn. According to my own experience this is a fairly well-defined though perhaps a slight variety.

572*bis*. Alchemilla argentea Don. This was excluded on the strong recommendation of Rev. E. F. Linton, following M. Buser. I have since learned from Mr. Beeby that it has considerable claims to rank (a nearly allied subspecies grows in the Faroes); and there is the high authority of Babington in favour of its retention.

579. Rosa involuta Sm. This and *R. hibernica* (which is of Templeton, not Smith) are kept up as a matter of convenience,

owing to the extreme difficulty of exactly defining the parentage of the various plants placed under them. I believe the Irish type-*hibernica*, which has hairy leaves and woolly styles, to be *coriifolia* × *spinosissima*; and the E. Sutherland var. *glabra* is clearly *glauca* × *spinosissima*.

598. R. DUMETORUM Thuill. b. OBTUSIFOLIA (Desv.). This seems to me quite misplaced here; if not the type of the *tomentella*-group, it should be treated as a parallel species.

608. R. SEMPERVIRENS L. Add b. MELVINI (Towndrow). What is the status (native or naturalised) of this rose? It was referred by Crépin to *R. sempervirens*, and seems to be unknown on the Continent.

612. PYRUS INTERMEDIA Ehrh. Some authorities identify this with *P. scandica* Aschers.; but our *intermedia* of the Wye Valley and Cheddar is plainly distinct from that, and I believe it to be really *P. Aria* × *torminalis*.

628. SAXIFRAGA GEUM L. Mr. R. W. Scully, who has for some time past made a special study of this intricate group, informs me that the typical plant, with reniform, crenate leaves, occurs in Kerry, though it is scarce.

673. CALLITRICHE PALUSTRIS L. An unsatisfactory name, as applied to the segregate *C. vernalis* Koch.

676. C. INTERMEDIA Hoffm. Add b. PEDUNCULATA (DC.); an unfortunate oversight.

677. C. OBTUSANGULA Le Gall b. LACHII (Warren). Mr. Druce writes this *lachii*; but in 1890, Lord de Tabley (J. L. Warren) told me that the name was taken from a sheet of water on his estate, called "The Lache." I have seen no specimens; but the description suggests a hybrid origin, viz. *C. intermedia* × *obtusangula*.

687. EPILOBIUM COLLINUM Gmel. I have seen two specimens of this distinct species from an old Surrey herbarium, labelled simply "Scotland." It is an Icelandic, Scandinavian, and Pyrenean plant, likely to be refound in the Highlands, and may perhaps also occur among the Welsh hills. See *Journ. Bot.* 1904, 110.

695. E. ANAGALLIDIFOLIUM Lam. The census-number (24) has slipped out.

698. ŒNOTHERA AMMOPHILA Focke. I have lately examined afresh the evening primrose so abundant on the sandhills near Burry Port and Kidwelly, Carmarthenshire, and found it to be identical with the Burnham plant named by Dr. Focke.

722. CARUM PETROSELINUM Benth. & Hook. fil. This ought to be starred, being naturalized on ruins (Scully); I have only seen it sporadically, so far as I can remember.

792. GALIUM PALUSTRE L. b. ELONGATUM (Presl.). Nyman is probably right in upholding this as a separate species; with us it is pre-eminently a fenland plant.

808. CENTRANTHUS CALCITRAPA Dufr. hardly deserves inclu-

sion, but is in many herbaria, and was therefore retained ; Major Wolley-Dod could not find it on the old walls at Eltham where it formerly grew, but it may yet reappear.

810. VALERIANELLA ERIOCARPA Desv. may be truly wild in the Portland station given in *Fl. Dorset*, ed. 2, being a native of W. France.

836. GNAPHALIUM ULIGINOSUM L. b. PILULARE (Wahlenb.). Mr. Fryer's solitary experience is not, I think, conclusive against this. Rouy (*l. c.* viii. 184) maintains it as var. *pilulare* Koch ; Nyman treats it as a subspecies, but restricts its range to Lapland, Finland, N. Russia, and Prussia, so the southern race may not be quite identical. I have only once met with the papillose-fruited plant in Kent ; all the individuals examined were similar, and there was nothing in the local conditions to suggest abnormality.

850. GALINSOGA PARVIFLORA Cav. This came up plentifully, year after year, in an allotment-field at Milford, Surrey. The reviewer is no doubt right ; and it should be starred, as an established alien.

895. ARCTIUM NEWBOULDII Ar. Benn. Mr. Druce appends his own name ; I have known it for several years as Mr. Bennett's plant, but am not sure that he has actually published it.

899, &c. CNICUS is retained, following Benth. & Hook. fil. ; but *Cirsium* may be preferable.

913. CENTAUREA SCABIOSA L. b. SUCCISÆFOLIA. This has been identified by Mr. Williams (*Prodr. Fl. Brit.*) as var. *Gelmii* Briquet ; but the description of var. *Gelmii* in Rouy, *l. c.* ix. 146, indicates a very different plant. I have not seen a description of var. *integrifolia* Gaud., which may be identical. A friend who saw var. *succisæfolia* in cultivation (1901) exclaimed :—" Now *that's* what I call a *species* ! " and I still regard it as a very good variety.

HIERACIUM. Rev. W. R. Linton unfortunately did not live to revise his list, one or two small changes in which were made with his consent at my suggestion.

975 *bis*. Insert H. CAMBRICUM F. J. Hanb. — 3. A very distinct species, which remained unchanged in my garden from 1888 to 1900.

990 *bis*. Add H. LONGILOBUM Dahlst.—2. (72 Dumfries ; 88 Mid-Perth). W. R. L. sent me both wild and cultivated specimens, and we gathered it last July in quite a lowland station near Moffat. I am not sure that it is rightly placed just here, but incline to put it somewhere near 1019 (*dissimile*) or 1021 (*duriceps*). W. R. L. formerly referred the Dumfriesshire mountain-plant to his *H. oxyodus*.

1040. H. DOVRENSE Fr. b. HETHLANDIÆ. The authority should be F. J. Hanb.

1042. H. BREVE Beeby in *Ann. Scott. Nat. Hist.* 1908, 112–3. A very striking plant, nearer to the Kerry *H. Scullyi* than any of our other species.

1045. H. DEMISSUM Strömf. c. AUSTRALIUS Beeby, *l. c.* 114; where *demissum* is regarded as a subspecies of *dovrense.*

1048. H. "SUBLUDENS." A *lapsus calami*; it is *H. subtruncatum* Beeby, *l. c.* 114–5. Mr. Beeby at first thought of naming it *H. truncatum* var. *ludens*; but after seeing a good series Mr. Linton considered that it deserved specific rank.

1051. H. STICTOPHYLLUM Dahlst. Some of the Perthshire specimens (near Fortingal, and at the foot of Ben More) have unspotted leaves, and otherwise differ from the normal Scottish plant; W. R. L. latterly inclined to put them under *H. norvegicum* Fr., to the var. *confertum* of which Prof. Lindeberg (I believe) originally referred them.

1060. H. CROCATUM Fr. d. CONGESTUM Beeby, *l. c.* 115. Add e. VINACEUM Beeby (*ibid.*)—1.

1062. H. SABAUDUM L. This, if included, must stand as the specific name, on grounds of priority; and W. R. L. wrote to me that M. Arvet-Touvet considered *H. boreale* Fr. only varietally distinct from it. But, in the first place, the occurrence of true *sabaudum* in Britain is quite doubtful; and, in the second place, *H. boreale* appears to be regarded as a different species by all the Scandinavian authorities, from Fries onwards. I believe, therefore, that we shall do wisely in retaining *boreale* as the type of our plants, at least for the present.

1074. TARAXACUM SPECTABILE Dahlst. Probably not uncommon in the Scottish Highlands; I have several times noticed dandelions with blotched leaves and orange-yellow flowers, but supposed them to be only alpine states of *T. palustre* or *udum.*

1098. CAMPANULA PERSICIFOLIA L. The query following the census-number was added in order to show that its status had been called in question; but when its discovery was published it was pretty confidently claimed as a native. It ought to occur in Britain, being found in Scandinavia, Holland, Belgium, France, and Spain.

1119. BRYANTHUS CŒRULEUS Dippel. Originally recorded from Aviemore, E. Inverness, some thirty miles north of its Perthshire station.

1120. DABŒCIA CANTABRICA K. Koch (Dendrol. ii. 1–132, 1872) should displace Rendle and Britten as the authority for this name.

1132. STATICE MARITIMA Mill. b. PLANIFOLIA, c. DURIUSCULA. Add Clarke & Marshall (Mr. Druce refers them to *S. linearifolia* Laterr.).

1142. LYSIMACHIA VULGARIS L. b. ANGUSTIFOLIA Wats. Rouy, *l. c.* x. 185 (dated February, 1890) gives a *β stenophylla* Boiss., Fl. Orient. iv. 8, which may be the same. "Feuilles étroitement lancéolées."

1163. CENTAURIUM PULCHELLUM Druce b. TENUIFLORUM. Rouy concurs with Lloyd in treating *Erythræa tenuiflora* Hoffmgg. and Link as a separate species (which is also, I believe, the opinion of Messrs. H. & J. Groves); while Nyman makes it a sub-

species of *E. linariifolia* Pers. (*littoralis* Fr.): so it might well be treated accordingly.

1169 *bis*. GENTIANA ULIGINOSA Willd. perhaps deserves to be included, as Wettstein appears to have seen Scottish specimens. The Nairn plant which I thought might be referable to it is, I now believe, only a peculiar state of *G. baltica* Murb.

1187. PULMONARIA OFFICINALIS L. The native plant, which occurs in E. and W. Suffolk, has always seemed to me varietally distinct, though I could obtain no special name for it. In cultivation (twelve years or more) it remained perfectly constant. At last I can identify it as *β immaculata* Opiz = *P. obscura* Dumort. Rouy, *l. c.* x. 299, makes it a "race," and gives the following description and distribution (outside France). "Se sépare du type (*P. officinalis* L.) par: *Feuilles non maculées ou très rarement maculées*, *les estivales radicales* plus grandes, *à limbe ovale-lancéolé* cordé et *acuminé*, 2 *fois plus long que large*, *ordinairement sensiblement plus court que le pétiole étroit*, profondément canaliculé; *feuilles caulinaires* plus *grandes* et plus *étroites*, *ainsi que les calices fructifères*; corolle d'un ton rougeâtre plus accentué, rarement blanche.—Avril–mai. Aire géog.—*Suède*, *Russie*, *Danemark*, *Belgique*, *Allemagne*, *Suisse*, *Autriche-Hongrie*, *Turquie*.—Etc.?" Our plants should therefore stand as **officinalis* L. and b. *immaculata* Opiz—2.

1190. MYOSOTIS SCORPIOIDES L. A name of questionable application, for which we should prefer to adopt *M. palustris*, Hill, following Mr. Druce; in that case the authority for c. *hirsuta* is Braun.

1192. M. PYRENAICA Pourr. According to M. Rouy (*l.c.* 335), with whom Nyman agrees, this species is restricted to the Pyrenees, Corsica, and Italy; nor does his description tally with our plant. Mr. Williams, however, believes that the name is right, and adds:—"Authentic specimens (Pyrenean) in Herb. Kew. agree with Perthshire examples. The solitary flower in the fork of the two terminal flowering branches, which is given as a distinctive character of *M. pyrenaica*, is present in Perthshire specimens, and the nucules are exactly alike in both. . . . Rouy takes description and habitat from Grenier & Godron, which are incorrect; Willkomm & Lange, *Prodr. Fl. Hisp.*, come nearest the mark." As our *M. alpestris* Schmidt is a Pyrenean species, confusion may easily have arisen; and the southern "*pyrenaica*" will probably have to be called *M. alpina* Lap., which is given as a synonym by both Rouy and Nyman.

1195. M. COLLINA Hoffm. Under *M. hispida* Schlecht., a name which he prefers, M. Rouy gives a "*β Lebelii* Corb. *Fl. Norm.*, p. 407; *M. Lobelii* Godr. *ap.* G. et G. *Fl. Fr.*, 2, p. 532 (*valde emend.*!); *M. adulterina* Lebel *Obs.*, p. 17.—Grappes ± feuillées à la base; corolle blanchâtre, souvent bordée de bleu pâle.—Manche, surtout près du littoral." This, I suspect, may be the same as our var. *Mittenii* Baker.

1207. CUSCUTA TRIFOLII Bab. The query after the census-

number was added in deference to the strong adverse opinion of Messrs. Clarke and Druce. This species is, of course, usually a casual in clover-fields; but I have good ground for believing it to be indigenous, though quite locally so, both in England and Ireland.

1217. VERBASCUM NIGRUM L. b. TOMENTOSUM Bab. This is not confined to Alderney; a specimen gathered by me near Tilford, Surrey (where it occurred in two stations), was submitted to Prof. Babington and confirmed by him. *V. virgatum* is, I believe, native in Devonshire.

1241. VERONICA DIDYMA Ten. The identification of this with his *V. polita* was strongly objected to by Fries, *Mantissa*, iii. 169:—"Veronica *polita* Fr. Nov. Suec. p. 2. Hæc, ut singula a me proposita species, ad varietates rejecta fuit, . . . tandem vero ab omnibus recepta, sub alieno tamen nomine: *V. didymæ* Tenore. Est vero nostra planta absolute *V. agrestis* Tenore, ut specimina ab ipsius manu et Cel. Professor *Wahlberg*, qui cum Tenoreo legit, testantur. Descriptio *V. agrestis* Tenore v.c. in *Fl. Med. Univ.* ita clare omnes notas *V. politæ* exhibet, ut numquam ne levissimum quidem dubium de illius synonymo jure moveri possit. Quid sit *V. didyma* Tenore non ita plene demonstrare valeo (specimina ejus culta a me visa, jam monente Ill. Reichenbach, ad *V. opacam* pertinent), cum vero 'calycibus foliaceis dentatis corolla multo majoribus' dignoscatur, neutiquam ad *V. politam* referri potest, sed singulo verbo exacte cadit in *V. agrestem* v. *calycidam* Nov. l.c. (perperam indicatur me *V. calycidam* pro specie proposuisse) et cum hæc foliis ovatis nitidis *V. politæ* similior est, quam *V. agresti* et ab acutissimis Botanicis pro *V. polita* sæpe missa (Ill. Reichenbach hanc quoque a *V. agresti* excludit, et ad *V. politam* ducit) nullum mihi dubium superest e simili commutatione *V. didymæ* nomen ad *V. politam* translatum." I am strongly of opinion that the older name of Tenore has been too hastily taken up, and should be dropped. The species will accordingly stand as *V. polita* Fr., with b. *grandiflora* Bab.

1258. V. ANAGALLIS-AQUATICA L. c. MONTIOIDES. The authority should be written (Boiss.), Boissier having published it as a species. I have gathered what seems to be this on drying mud in the moat of Westenhanger Castle, E. Kent—a small annual, with pinkish flowers.

EUPHRASIA. In the case of the commoner segregates the numbers are underestimated; my method was to add together the vice-counties specified in a MS. notebook of Mr. Townsend, those of my own notes and specimens, and such records as I could ascertain since the publication of Mr. Townsend's monograph in *Journ. Bot.*

1262. E. BREVIPILA Burn. & Gremli. Add b. *subeglandulosa* Towns.; I do not, however, know of any published description.

(To be concluded)

ALABASTRA DIVERSA.—Part XVII.

By Spencer le M. Moore, B.Sc., F.L.S.

The plants dealt with in the present paper are mainly *Asclepiadeæ*, an order rapidly being reinforced by new African species, in spite of its having been so recently and so thoroughly monographed in the *Flora of Tropical Africa*. The collections concerned are those of Mr. C. F. M. Swynnerton, an account of whose plants from Eastern Rhodesia and the neighbouring Portuguese territory is in preparation at the Museum; of Dr. A. G. Bagshawe, well known for his work in Uganda; of Mr. Gossweiler, who recently sent home a large and very interesting assortment of Angola plants; of Mr. Kässner, who is travelling in North-eastern Rhodesia; and of Mr. Eyles, whose discoveries in the Mazoe District have received notice from time to time in the pages of this Journal. The opportunity has also been taken of including descriptions of a few new African plants belonging to other natural orders.

Acknowledgements are due to Mr. N. E. Brown and to Mr. S. A. Skan for kindly giving me the benefit of their acquaintance respectively with African *Asclepiadeæ* and *Scrophulariaceæ*.

Rubiaceæ.

Oxyanthus unyorensis, sp. nov. Fruticulosus, glaber, ramulis sat gracilibus juvenilibus aliquanto complanatis deinde subteretibus, foliis oblanceolato-obovatis sursum caudatis, apice obtusiusculis basin versus in petiolum brevem gracilem attenuatis papyraceis costis secundariis utrinque 5–6 apertissime arcuatis, stipulis e basi late triangulari in acumen sat longum exeuntibus, corymbis abbreviatis paucifloris, bracteis late subulatis acuminatis, ovario quam calyx breviore cylindrico longitrorsum costato, calycis limbo tubuloso quam lobi subulati breviore, corollæ tubo valde elongato intus triente superiori glabro ceterum piloso lobis anguste linearibus comparate elongatis, antheris lineari-oblongis basi breviter bilobis filamentis brevibus insidentibus, ovario 2-loculari, stylo breviter exserto stigmate anguste clavato apice bifido coronato, bacca——.

Hab. Murchison Falls, Victoria Nile, *Bagshawe*, 1599.

Folia ± 10 cm. long., 3 -4·5 cm. lat., horum cauda circa 1·5 cm. long.; petioli 4–7 mm. long. Stipulæ 7 mm. long. Corymbi (corollis exemptis) summum 1 cm. long. Bracteæ 3–4 mm. long., margine sub lente ciliolatæ. Flores albi. Ovarium 3 mm., calycis limbus indivisus 2 mm., lobi 3 mm. long. Corollæ tubus 12·5 cm. long., humectatus 2 mm. lat.; lobi 25 × 1·5 mm. Filamenta ·75 mm., antheræ ·375 mm. long. Stylus 14 cm. long., stigma 5 mm.

Looks a good deal like *O. pallidus* Hiern, which has larger coriaceous leaves not markedly caudate above, longer stipules running out more gradually into the acumen, longer and larger

corymbs, broader corolla-lobes, a one-celled ovary, and narrower stigma.

COMPOSITÆ—VERNONIACEÆ.

Erlangea (§ EU-ERLANGEA) **hispida**, sp. nov. Herbacea, metralis, caule erecto ramoso ramis sat validis subteretibus striatis hispide pubescentibus deinde scabriusculis ramulis pilosis hispide pubescentibus, foliis subsessilibus alternis oblongo-lanceolatis acutis basi obtusis margine crenato-serratis supra scabridis subtus pilis hispidis onustis, capitulis ad normam generis submediocribus, plurifloseulosis in corymbis oligo- vel pleiocephalis ramos ramulosque terminantibus folia sæpe superantibus digestis, involucri ovoidei phyllis 5-serialibus extimis herbaceis anguste lineari-lanceolatis acutis hispidis reliquis oblongo-ovatis breviter acuminatis anguste scarioso-marginatis intermediis superne hispidis et ut interiora intimaque dorso glandulis parvulis copiose inspersis, flosculis breviter exsertis, acheniis oblongo-turbinatis 5-sulcatis glabris, pappi setis paucis scabridis caducissimis.

Hab. Portuguese West Africa, Kubango, at Forte Princeza Amelia; *Gossweiler*, 3868.

Folia exempl. unici nobis obvii summum 3·5 cm. long. et 1·3 cm. lat., membranacea, in sicco utrinque viridia, creberrime glandulosa. Corymbus ramum terminantem 7 × 8 cm., corymbi ramulis fulti 1·5–2 × 2–2·5 cm. Pedunculi proprii hispidi, 3–7 mm. long. Involucra 8 × 6 mm.; phylla extima 3–5 mm. long.; intermedia 5·5–6 mm., intima 7 mm. long. Corollæ lavandulaceæ, 5·5 mm. long., hinc inde glanduliferæ; tubus superne leviter ampliatus, 3·5 mm. long.; lobi lineari-lanceolati, obtusi. Styli rami 1·75 mm. long. Achænia 2 mm. long., leviter curvata, brunnea. Pappi setæ pallide straminea, 1–2 mm. long.

The hispid clothing and shape of the involucres easily serve to distinguish this plant, which Mr. Gossweiler has noted as being fragrant.

Gossweilera, genus novum.

Capitula homogama, tubuliflora. Involucri campanulati phylla pluriseriata, subscariosa, extima abbreviata cetera appendice scariosa onusta. Receptaculum breviter conicum, paleis involucri phyllis similibus flosculos amplectantibus copiose præditum. Corollæ actinomorphæ tubus sursum gradatim amplificatus; limbus 5-lobus. Antheræ basi breviter sagittatæ auriculis aliquanto connatis obtusis. Styli rami filiformes, acutiusculi, hirtuli. Achænia callo basali carentia, subcylindrica, pappo cupuliformi tenero ore denticulato coronata.—Verisimiliter frutex alternifolius. Capitula sat parva in corymbo pluricephalo bracteato disposita. Corollæ puniceæ.

Gossweilera lanceolata, sp. unica. Caule erecto subtereti in longitudinem pluristriato, foliis petiolatis anguste lanceolatis (summis abbreviatis anguste lineari-lanceolatis) superne attenuatis apice induratis obtuse acutisque margine late dentatis firme membranaceis supra scabridis subtus sparsim pubescentibus, corymbis pubescentibus foliis circa æquilongis, bracteis linearibus superioribus

lineari-subulatis quam pedunculi proprii capitula plerumque superantes plane brevioribus, involucri puberuli phyllis 5-serialibus extimis paucis parvis lineari-lanceolatis acutis ceteris oblongis appendice suborbiculari denticulata terminatis, corollis breviter exsertis, achæniis hucusque crudis glabris pappum breviter excedentibus.

Hab. Portuguese West Africa, Kakonda, where it is rare; *Gossweiler*, 4344.

Folia usque ad 10 cm. long., sed sæpe breviora, 1·5–2 cm. lat., in sicco pag. sup. læte viridia, pag. inf. vero pallidiora; petioli circa 1 cm. lat.; folia summa pauca, 4–7 cm. long., 7–10 mm. lat. Corymbus circa 10 cm. long., vix totidem diam. Pedunculi proprii filiformes, puberuli, sæpius 1–2 cm. long.; horum bracteæ solemniter 2–7 mm. long. Involucrum humectatum 7 × 8 mm.; phylla extima 3 mm. long.; intermedia 5 × 1·5 mm.; intima 6 mm. long.; horum appendices verisimiliter dilute puniceæ. Receptaculi paleæ lineari-lanceolatæ, appendice haud exclusa 6 mm. long., appendix ipsa suborbicularis, 1·5 × 1·5 cm. Corollæ in toto 6 mm. long., extus sparsissime glandulosæ. Styli rami vix 2 mm. long. Achænia 1·5 mm. long., pappus 1 mm.

This is a remarkable plant, and on account of the style-arms should, I think, be placed in *Vernoniaceæ*, although in several ways it approaches *Helianthoideæ*. *Vernoniaceæ* with a paleæceous receptacle are very rare; such are the Brazilian *Heterocoma*, and one or two more, including the recently described *Dewildemania* O. Hoffm., from which the present plant differs entirely in the pappus.

Veronnia (§ Lepidella) **Tufnellæ**, sp. nov. Caule ascendente divaricatim ramuloso in longitudinem prominenter striato pubescente mox puberulo novellis dense fulvo-pubescentibus, foliis petiolatis lanceolatis vel lanceolato-ovatis superne gradatim attenuatis apice acutis basi rotundatis subrotundatisve margine undulatis raro undulato-dentatis membranaceis in sicco viridibus supra scabriusculis subtus puberulis, capitulis ad normam generis parvis circa 18-flosculosis in paniculis laxis pleiocephalis folia excedentibus raribracteatis pubescentibus digestis, pedunculis propriis filiformibus involucra excedentibus, involucri late campanulati 4-serialis phyllis anguste oblongo-ovatis intimis oblongis exterioribus abbreviatis interioribus quam exteriora plane longioribus omnibus obtusis carinulatis costa viridi percursis papyraceis puberulis dilute viridibus intimis sursum purpureis, flosculis exsertis, corollæ extus sparsissime minutissimeque glandulosæ tubo superne leviter ac sensim amplificato, achæniis cylindrico-turbinatis 6-costatis pubescentibus adjectis glandulis paucis lucentibus intercostalibus, pappi squamis angustissime linearibus acutis setis scaberrimis albidis.

Hab. Unyoro, in grass; *Mrs. Herbert Tufnell.*

Folia 2·5–4 cm. long., 1–2·5 cm. lat., glandulis immersis copiosis gaudientia, subtus paullo pallidiora; petioli 4–7 mm. long. Paniculæ usque ad 10 cm. long. et 20 cm. lat.; harum bracteæ vetustiores foliis similes, juveniles meras ad squamas redactæ.

Pedunculi proprii sæpius 1–1·5 cm. long., raro fere 2 cm. attingentes. Involucrum 8 mm. long., 1 cm. lat.; phylla extima circa 2 mm., intermedia 2·5–4 mm., interiora 6–7 mm. long. Corollæ tubus 7 mm. long., inferne ·4 mm., faucibus 1 mm. lat.; lobi vix 2 mm. long. Styli rami 3 mm. long. Achænia 2 mm. long., pappi squamæ 1 mm., setæ 7 mm. long.

Similar in foliage to *V. Wollastoni* S. Moore, but easily distinguished from it by the quite different involucres.

Vernonia (§ Stengelia) **lancibracteata**, sp. nov. Herbacea, spithamea vel paullo ultra, caule e rhizomate crasso ascendente rariramoso ramulis striatis foliosis ferrugineo-pubescentibus demum puberulis, foliis sessilibus oblongo-oblanceolatis apice mucronatis margine calloso-dentato-serrulatis inferne sensim angustatis chartaceis supra scaberrimis subtus in nervis scabriusculo-puberulis, capitulis majusculis solitariis multifloseulosis breviter pedunculatis pedunculis ferrugineo-pubescentibus ipso sub capitulo bracteas paucas anguste lineari-lanceolatas scabriusculas involucri phylla extima mentientes gerentibus, involucri hemispherici 4-serialis phyllis extimis lineari-lanceolatis ut bracteæ circumstantes mucronatis necnon viridibus phyllis ser. 2 oblongo-ovatis mucronatis inappendiculatis phyllis interioribus oblongo-ovatis sursum appendicibus lanceolatis acuminatis scariosis onustis, flosculis exsertis, corollæ tubo glandulis perpaucis pellucidis prædito superne subito dilatato, achæniis cylindricis 6-costatis appresse sericeo-pubescentibus, pappi setis 4-serialibus intus gradatim longioribus scabriusculis stramineis interioribus complanatis.

Hab. Rhodesia, Mazoe; *F. Eyles*, 291.

Rhizoma radices paucas sat validas tuberoso-inflatas emittens. Folia 5·5–7·5 cm. long., 1·3–2 cm. lat., in sicco viridia, summa aliquanto imminuta sed in bracteas nequaquam transeuntia. Pedunculus circa 1 cm. long. Bracteæ circa 1·2 cm. long. Involucrum 2×2 cm.; phylla extima 12–14 mm., intermedia 16 mm., intima fere 2 cm. long. Flosculi dilute lavandulacei. Corollæ tubus 16 mm. long. (pars amplificata modo 1·5 mm.), inferne ·3 mm. faucibus 1 mm. lat.; lobi anguste lineari-lanceolati, 2·5 mm. long. Styli superne incrassati rami basi complanati ut stylus ipse horum sub insertione puberuli, 3·5 mm. long. Achænia 2·5 mm., pappi setæ exteriores 2–5 mm., interiores 7–9 mm. long.

A remarkable plant, easily recognisable by the solitary heads with green bracts surrounding the involucres, whose outer leaves they closely resemble in size, form, colour, and consistence.

Asclepiadeæ.

Raphionacme madiensis, sp. nov. Caule erecto e rhizomate validiusculo orto pauciramoso, ramis compressis crassiusculis pubescentibus, foliis ad normam generis majusculis oblongis vel oblongo-obovatis obtusissimis vel subito brevissime acutatis basi in petiolum brevem sensim coarctatis firme membranaceis utrinque scabriusculo-pubescentibus in sicco viridi-griseis, floribus mediocribus in cymis axillaribus brevibus sublaxe plurifloris pubescenti-

bus dispositis, bracteis lineari-subulatis pubescentibus, calycis segmentis corollæ tubo æquilongis lanceolatis acuminatis extus pubescentibus, corollæ extus pubescentis tubo sursum leviter amplificato lobos oblongos obtusos circa semi-æquante, coronæ phyllis corollæ ori insertis gynostegium longe excedentibus lineari-bus inferne sensim amplificatis superne longe attenuatis apice integris vel sæpius bifidis rarissime (in floribus a nobis scrutatis non plus quam semel) alte bipartitis, filamentis juxta basin coronæ phyllarum insertis quadratis basi utrinque appendice parva auctis, antheris oblongis acutis stigma plane excedentibus.

Hab. Madi; *Bagshawe*, 1611.

Foliorum limbus 5–8 cm. long., 1·5–4 cm. lat.; costæ secundariæ utrinque 10–12, pag. inf. aspectabiliores; petioli 5–10 mm. long. Cymæ (floribus inclusis) 1·5–2·5 × 1·5–2 cm.; bracteæ 2–3 mm. long. Pedicelli graciles, circa 5 mm. long. Calycis segmenta 3 mm. long. Corollæ tubus 3 mm. long., ore 4 mm., basi 2 mm. lat.: lobi virides, apice violacei, 7 mm. long. Coronæ phylla 8 mm. long.; horum lobi apicales dum adsint circa ·5 mm. long. Filamenta 1 mm., antheræ 1·5 mm. long.; translatores spathulati, 1·5 mm. long.

Nearest *R. lanceolata* Schlechter, which is different, among other characters, in leaf, smaller corolla, and much shorter lanceolate coronal leaves.

Raphionacme Gossweileri, sp. nov. Caule abbreviato e tubere napiformi lactifero ascendente sursum pauciramoso in sicco compresso glabro ut ramuli breves foliosi puberuli crassiusculo, foliis oblongo-oblanceolatis obtusis deorsum in petiolum brevem angustatis crasse membranaceis utrinque puberulis, floribus mediocribus solitariis terminalibus axillaribusve, pedicellis flores excedentibus crassiusculis leviter puberulis, calycis segmentis inter se paullulum imparibus lanceolatis vel lanceolato-oblongis obtusis vel obtusiusculis extus pubescentibus, corollæ alte partitæ lobis calycem longe excedentibus oblongo-lanceolatis extus puberulis quam tubus glaber multo longioribus, coronæ phyllis una cum filamentis corollæ faucibus insertis stamina plane excedentibus anguste linearibus integris basi dilatatis, filamentis basi amplificatis, stylo quam antheræ paullo breviore conoideo.

Hab. Portuguese West Africa, near Kuiriri, east of Kossuogo; *Gossweiler*, 3273.

Tuber ex schedis cl. detectoris 5 cm. ("2 inches") diam. Caulis summum 5 cm. alt. Folia 1·8–3·5 cm. long., 5–12 mm. lat.; costa media nonnunquam albo-pubescens, fac. inf. prominens; costæ ord. sec. circa 6–8, tenuissimæ. Pedicelli summum 2 cm. long. Calycis segmenta 3·5–4 mm. long. Corollæ tubus 2·5 mm., lobi 13 mm. long. Coronæ phylla 1·3 cm. long., ima basi 1 mm. lat., paullulum supra basin ·5 mm., inde gradatim sensissime angustata, sursum torta, verisimiliter viridia. Filamenta 3 mm., antheræ 5 mm. long. Stigmatis apex ab antheris adusque 1·5 mm. superata.

A lowly tuberous rubber-yielding plant has recently been described (*Kew Bulletin*, 1908, p. 209) under the name of *Raphionacme utilis* N. E. Br. & Stapf; but *R. Gossweileri* is quite diffe-

rent from that in foliage, corona, &c. Incidentally it may be observed that *R. utilis* is described and figured as having a double corona, and this leads one to doubt whether it be a *Raphionacme* at all. Possibly *R. Gossweileri* may also yield rubber, but that is a matter for further investigation.

Xysmalobium Kaessneri, sp. nov. Caule e rhizomate crasso crebro radicifero erecto juxta solum tereti superne compresso primum hirsuto-pubescente tandem puberulo, foliis petiolatis sat amplis ovato-oblongis obtusis vel obtusissimis basi leviter rotundatis crassiusculo-membranaceis in nervis piloso-puberulis, umbellis sessilibus interpetiolaribus circa 6-floris, pedicellis flores excedentibus hirsuto-pubescentibus, calycis segmentis linearilanceolatis acuminatis extus hirsuto-pubescentibus, corollæ lobis oblongo-lanceolatis apice oblique emarginatis reflexis, coronæ phyllis ex basi columnæ staminеæ quam sese multo longioris ortis deorsum oblongis sursum incrassatis subglobosis juxta medium dente crassiusculo deltoideo obtusissimo præditis, antherarum alis elongatis valde prominentibus appendicibus rotundatis supra stigma inflexis.

Hab. North-West Rhodesia, under trees at Sangolo Spruit, near Broken Hill; *Kässner*, 2104. [Also at Kew, Brit. Cent. Africa; *K. J. Cameron*, 133.]

Foliorum limbus 4·5–6 cm. long., 2–3 cm. lat., in sicco griseoviridis; costæ secundariæ pluries, ut costulæ laxe reticulatæ utrinsecus maxime aspectabiles; petioli crassiusculi, 5–8 mm. long. Pedicelli summum 1·5 cm. long., sed sæpe breviores. Flores verisimiliter virides. Calycis segmenta 6 mm. long. Corollæ lobi 9 × 4·5 mm. Coronæ phylla in toto 3·25 mm. long.; pars basalis 1·25 mm., pars superior incrassatus 2 × 2 mm.; illorum dens ·6 mm. long. Antherarum alæ 5 mm. long.; appendix 2 × 1·5 mm. Caudiculæ obliquæ, 1 mm. long.; pollinia pyriformia, 1·2 mm. long. Stigma antheris ipsis (appendicibus exemptis) æquilongum, 5 sulcatum, fere 2 mm. diam.

To be inserted next *X. reticulatum* N. E. Br., but easily distinguished on sight from broad-leaved forms of that species by means of the larger flowers, the subglobose swellings at the tops of the larger coronal leaves and the longer and very prominent wings to the anthers.

Schizoglossum chirindense, sp. nov. Caule erecto crassiusculo hirtulo-pubescente, foliis stricte oppositis brevipetiolatis lanceolatis vel lanceolato-linearibus obtusis basi plus minus rotundatis nequaquam cordatis utrobique hirtulo-pubescentibus, umbellis lateralibus pedunculis manifestis etsi a foliis superatis insidentibus 4–12-floris pedicellis ut pedunculi hirtulo-pubescentibus flores æquantibus, bracteis linearibus pubescentibus quam pedicelli brevioribus, calycis lobis lanceolato-oblongis acutis dorso piloso-pubescentibus margine ciliolatis, corollæ lobis oblongo-ovatis obtusis emarginatisve dorso sub lente minutissime puberulis, coronæ phyllis e basi gynostegii ortis quam corollæ paullo brevioribus gynostegio paullo inflexis pandurato-oblongis apice truncato-emarginatis basi nequaquam auriculatis carina crassiuscula per-

cursis in dentibus 2 lanceolato-oblongis juxta basin phylli terminante, antherarum appendicibus reniformibus stigma vertice planum pentagonum 5-sulcatum breviter impendentibus.

Hab. Rhodesia, near Chirinda, 3800 ft.; *Swynnerton*, 246.

Folia solemniter 6-7 cm. long., 1·2–1·5 cm. lat., in sicco griseo-viridia; costæ ordinis 2di plures; rete sat aspectabile; petioli 3–5 mm. long. Pedunculi umbellarum florentium 1–1·5 cm. long., validi. Bractæ ± 7 mm., pedicelli circa 1 cm. long. Flores fusco-brunneo-purpurei. Calycis lobi 8 mm. long., basi 3 mm. lat. Corollæ lobi 1 cm. long., summum 4 mm. lat. Coronæ phylla 8 mm. long., ima basi vix 2 mm. lat., superne 3 mm. Gynostegium circa 2 mm. alt. Antherarum appendices 1·2 × 1·5 mm. Pollinia pyriformia, 1 mm., glandula ·3 mm., caudiculæ ·25 mm. long.

The affinity is with *S. scyphostigma* K. Schum. and *S. distinctum* N. E. Br., the former of which has smaller calyx-lobes, white corollas pubescent outside, and coronal leaves with a triangular auricle on each side of the base and a linear distal portion. Among other points *S. distinctum* has shorter coronal leaves auricled at base and constricted in the middle with a pair of teeth at the constriction.

Asclepias Bagshawei, sp. nov. Herbacea caule ex tubere majusculo lignoso oriundo a basi ramoso, ramis foliosis subteretibus eximie striatis glabris (juvenilibus compressis puberulisque) in sicco viridibus, foliis anguste lineari-oblongis sursum extenuatis utrinque obtusis petiolis brevibus sat latis fultis pag. inf. leviter scabriusculis ceteroquin glabris in sicco viridibus, floribus mediocribus in umbellis 2-5-floris longe (sæpe longissime) pedunculatis ex axillis paucis summis ortis et corymbum laxum referentibus digestis, bracteis minutissimis, pedicellis flores longe excedentibus microscopice puberulis, calycis segmentis oblongo-lanceolatis acutis puberulis, corollæ alte divisæ glabræ lobis anguste ovato-oblongis obtusis tandem reflexis, coronæ phyllis gynostegium plane excedentibus ad 2 mm. supra basin ex eodem oriundis deorsum oblongis lateribus inferne sese convenientibus parte terminali truncato quam lobi laterales triangulari-deltoidei fere horizonales paullulum breviore dente minuto obtuso onusta, stigmate 5-sulcato depresso.

Hab. Nile Province, Bari; *Bagshawe*, 1640.

Planta circa ⅔ metralis. Tuber 20 × 9 cm. Folia solemniter 6–13 cm. long., 4–9 mm. lat., leviter crassiuscula; petioli ± 3 mm. long. Pedunculi inferiores summum 30 cm. long., sæpe vero breviores (sc. 20 cm.), superiores 5 cm. vel ultra. Pedicelli 2·5–3 cm. long. Calycis segmenta 4 mm. long. Corollæ griseo-lutescentis lobi 1 cm. long. Coronæ phylla viuide crocea, 6 mm. long., deorsum ægre 3 mm. lat.; lobi laterales 2 mm. long.; pars terminalis 1 mm. long., hujus dens ægre 1 mm. alt. Columna staminea nuda 2 mm. long. Antherarum alæ 3 mm. long., loculi vix 2 mm. Pollinia oblongo-pyriformia, 1 mm. long.; caudiculæ pars proximalis oblonga, vix 2 mm. long., pars distalis filiformis, 1·5 mm. Stigma 4 mm. diam.

Near *A. Welwitschii* Britten & Rendle, which it much resembles, but from which it is easily distinguished, among other features by the long peduncles and the shape of the coronal leaves; the lateral lobes of these are shorter and relatively broader, the terminal part is shorter and truncate, and the horn is replaced by a very small tooth.

Asclepias scabrifolia, sp. nov. Humilis (semispithamea) caule simplici ascendente tenui hirto-pubescente deinde puberulo, foliis oppositis comparate elongatis sessilibus anguste linearibus obtuse acutis margine revolutis firme membranaceis utrobique scaberrimis, umbellis 3–4-floris hirto-pubescentibus inferioribus longius superioribus brevius pedunculatis ex intervallis interpetiolaribus oriundis, pedicellis flores superantibus equantibusve hirto-pubescentibus, calycis segmentis lineari-lanceolatis acutis extus hirtulo-pubescentibus, corollæ rotatæ lobis calycem bene excedentibus late oblongo-ovatis obtusis extus piloso-puberulis, coronæ phyllis ad ·5 mm. supra basin columnæ staminеæ adnatis ab antheris leviter superatis intus pubescentibus nec dente nec cornu onustis lobis lateralibus basin fere attingentibus anguste ovato-oblongis obtusis erectis parte superiori cucullata lobis lateralibus circa æquilonga late deltoideo-ovata obtusa paullulum incurva adjectis lobulis interpositis 5 parvulis integris, antherarum appendicibus parvulis erectis.

Hab. Rhodesia, Chimanimani Mountains, *Swynnerton*, 1915.

Folia solemniter 3–5 cm. long., explanata circa 2 mm. lat.; costa media subtus crassiuscula necnon maxime eminens. Pedunculi summum 1·5 cm., sæpius vero ± 5 mm. long. Bracteæ filiformes hirtulo-pubescentes, circa 3 mm. long. Pedicelli 5–10 mm. long. Flores albi. Calycis segmenta 3 mm. long. Corollæ lobi 5 × 3·75 mm. Coronæ phylla 2 mm. long.; lobi laterales 1 mm. long.; pars superior 1 mm. long., basi 1·25 mm lat.; lobuli interpositi rotundati, ·25 mm. long. Antheræ circa 1·5 mm. long.; caudiculæ ·25 mm. long.; pollinia longe pyriformia, 1 mm. long. Stylus depressus, ægre 2 mm. diam.

A curious little plant known, besides its habit, by the small white flowers, the relatively broad corolla lobes, and the short leaves of the corona hairy and toothless inside with erect lobes the same length as the terminal portion.

Asclepias coarctata, sp. nov. Planta fere glabra caule erecto sat valido crassiusculo crebro folioso, foliis anguste lineari-lanceolatis fere a basi gradatim angustatis apice aliquanto induratis ima basi in petiolum brevem attenuatis crassiusculis, umbellis axillaribus peduculatis (pedunculis quam folia brevioribus) haud corymbosis plurifloris, bracteis comparate elongatis linearibus vel anguste lineari-lanceolatis breviter acuminatis, pedicellis pedunculis brevioribus sed flores longe excedentibus, calycis lobis lanceolatis sursum angustatis apice acutis, corollæ lobis calycem vix duplo excedentibus ovatis obtusis pag. sup. juxta marginem albo-piloso-pubescentibus, coronæ phyllis paullo supra basin gynostegii ortis gynostegium levissime superantibus complicatis a latere visis subquadratis sursum truncatis margine terminali utrinque in

dentem fere horizontalem gynostegium impendentem producta intus haud appendiculatis, antherarum appendicibus suborbicularibus.

Hab. Portuguese East Africa, Lower Umswirizwi River, 1000 feet: Chibabava, Lower Buzi River, 400 feet; *Swynnerton*, 248, 1895.

Folia circa 8 cm. long., raro 10 cm. attingentia, basin versus 5–7 mm. lat., inde adusque 1 mm. lat. gradatim attenuata, in sicco brunneo-viridia; petioli sat lati, 2–4 (rarissime 6) mm. long. Pedunculi ± 4 cm. long. Bracteæ longiores 1·5 cm. long. Pedicelli circa 2 cm. long. Flores albi. Calycis lobi 6 mm. long. Corollæ lobi patentes, 1 cm. long., 7 mm. lat. Coronæ phylla ad 1·2 mm. supra basin gynostegio inserta, 3·5 cm. alt.; dentes 1·5 mm. long. Gynostegium 4·5 mm. long. Antherarum appendices 1·25 × 1·5 mm. Pollinia lineari-oblonga, 1·1 mm. long.; caudiculæ ·25 mm., glandula oblongo-ovata, 1·3 mm. long. Stigma convexiusculum, 2 mm. diam.

Apart from their much greater size, the coronal leaves of this plant are almost exactly those of *A. tenuifolia* N. E. Br., close to which it should be placed. In other points there is so much difference between the two that further comparison is unnecessary.

(To be continued.)

SHORT NOTES.

Peloria in Pansy.—Through the kindness of Mr. F. J. Chittenden, F.L.S., Director of the Royal Horticultural Society's Laboratory at Wisley, I have received two specimens of the common garden pansy showing the peloric development. This is the first time I have seen this modification in the pansy, and Mr. Chittenden informs me that he was not previously acquainted with it. Hence it may be desirable to put on record the structure of these flowers. The calyces differed in the two specimens. In one there were five sepals, subequal in size, each provided with a well-developed calycine appendage. In the other flower there were only four free sepals, the two anterior ones being united to form an oblong structure, bifid at the end, and half as long again as the other sepals. The calycine appendage of this double sepal was large and trilobed. The petals in each flower were more nearly equal than is usual in the pansy, and each was provided with a well-developed spur, that of the anterior petal being the longest. The two anterior stamens were appendaged as usual, the other three stamens being without appendages in the flowers received.—E. Drabble.

Herpestis Monniera H. B. K. in Spain.—The Rev. P. B. Merino, S.J., of the Colegio del Apostol Santiago, La Guardia, Spain, sends for identification specimens of this plant, which he has collected in various places in Galicia, mostly on the coast. It

is widely distributed in warm countries of both hemispheres, but does not seem to have been recorded as adventive in Europe.

ACÆNA SANGUISORBÆ Vahl.—This Australian alien, which Mr. W. R. Martin found some years ago on Haytor Down, Dartmoor, still survives there; it was seen by me this year on July 22nd, not only on the Down, but also not far away on some enclosed land. There was a good quantity of it.—W. P. HIERN.

ISOETES LACUSTRIS L. ON DARTMOOR.—I found this plant on July 4th, 1908, growing in from three inches to three or four feet of water in a large pond, at an altitude of about one thousand feet above sea-level, on the southern border of the moor near the village of Cornwood. The bottom of the pond was of fine sand covered with a thin layer of very fine mud, and the plant was growing in such profusion that the whole bottom of the pond was given a green colour. No other plants were growing in association with the *Isoetes*, which appeared to be the sole occupant of the pond, even to the exclusion of freshwater Algæ in any quantity sufficient to be visible to the naked eye.—R. P. GREGORY.

FORFARSHIRE RECORDS.—*Linaria minor* has appeared in several localities in this county, on the cinder track of the railway to the east and west of Arbroath at Lunan Bay and Elliot. *Fumaria confusa* is not uncommon on the banks of the Lunan near the Inverkeilor Viaduct. *Coronopus procumbens* and *C. didymus* are growing between the North British Railway Station at Montrose and the bridge over the South Esk.—R. H. CORSTOPHINE.

[I am not sure whether attention has been called to the very frequent occurrence of *Linaria minor* (*L. viscida* Moench) on railway tracks. Mr. Dunn (*Alien Flora*, p. 145) says: "In England it is chiefly a weed of waste ground, affecting especially such localities as cinder-heaps near railway stations"; Mr. Druce (Fl. Oxf. 214) notes that it is "very fond of railway ballast" and (Fl. Berks, 370) "frequent along the permanent way of the Great Western Railway." Since I first saw it on the railway track at Barnetby, Lincolnshire, in 1862 (see *Naturalist*, i. 84) I have observed it in a similar situation in many places—in fact, I have seldom failed to find it if looked for, often however so covered with coal-dust as to be unnoticeable. Mr. Dunn does not refer to it as a plant of English cornfields in which—*e. g.* about High Wycombe—it frequently occurs in association with *L. Elatine* and *L. spuria*.—JAMES BRITTEN.]

SCLEROTINIA BACCARUM (Schröt.) Rehm IN STIRLINGSHIRE.—The sclerotia of this Discomycete are produced in fruits of the bilberry (*Vaccinium Myrtillus*), which are rendered abortive and soon become stunted in growth, and of a firm consistence and whitish appearance. These mummied berries appear to have been first noticed in Britain by Prof. Trail, Aberdeen, who found them near Lumphanan in September, 1888, and afterwards in other places in the east of Scotland. They have also been frequently

observed on the Ayrshire Hills, but the developed cups have not hitherto been recorded for Britain. When visiting the Campsie Hills, Stirlingshire, last May, I was so fortunate as to find some specimens of the brown stipitate ascophores of *S. baccarum* attached to withered fruits of bilberry. They occurred on an earth-covered ledge of rocks, fringed with bushes of *V. Myrtillus*, and were accompanied with numerous other berries containing sclerotia. Several of the cups have been preserved and placed in the Herbarium of the British Museum.—D. A. Boyd.

Mimulus moschatus Dougl.—This seems to be acclimatized in North Devon. In the parish of Belstone, on the northern side of Dartmoor, it was found apparently wild, July 9th, 1887; also in the parish of Marwood in August, 1891; in the parish of Southmolton in August, 1894, by Miss Saunders, and in subsequent years; also in the neighbouring parishes of Bishop's Nympton and North Molton. In the last-named parish it was observed again in considerable quantities on the right bank of the River Mole, August 15th of the present year.—W. P. Hiern.

Psamma baltica.—During a recent visit to Ross Links, Northumberland, to photograph *Psamma baltica* R. & S., I had a chance of making some observations on it. I have no doubt that the plant is a species and not a cross as some closet naturalists may have thought it. That the plant seldom produces seed is no proof it is a cross; the same thing takes place in regard to *Psamma arenaria*, of which I have never seen a seedling in the course of a long experience. Both plants increase by the rhizome, though not quite in the same way: in *P. arenaria* the growth of the rhizome is horizontal, in *P. baltica* it is vertical; in the last-named it seems to penetrate to a great depth—how deep I cannot say, as I had only a spud with me. The lanceolate panicle of a purple tinge, the purple nodes of the stem, the leaves which are more plane than involute, and which want the glaucous tint of *arenaria*, at once distinguish the plant.—A. Craig-Christie.

Plants new to Surrey.—In Journ. Bot. 1904, 385, *Physospermum commutatum* (*Danaa cornubiense*) is put on record from Buckinghamshire, a remarkable eastward extension of range of a plant hitherto known only in Britain from Cornwall and Devon. It is a pleasure to be able to record now a like eastward expansion of another western species, *Carum verticillatum*. This, unlike the *Physospermum*, occurs in other English, Welsh, and Scotch counties, but always on the western side of Britain; and Surrey, in which it may now be seen, is by far the most easterly point of its known distribution in these isles. Two years ago an enthusiastic botanist, Miss Muriel Saunders, came across the plant on a heath not far from Woking, and last July very kindly conducted me to the locality. It grew in some plenty, in a restricted area, in marshy ground, and was associated with *Erica*, *Lotus uliginosus*, *Genista anglica*, *Carices*, and the usual floral constituents of a bog

on a sandy heath. Since its first discovery in Surrey, a further station has been found for it, a mile or more distant, by another Surrey botanist, Miss Cardew, who has already enriched the county flora by adding to it *Holosteum umbellatum* (see Journ. Bot. 1905, 189); in this second locality, a boggy spot by a road-side, I was pleased to see it growing profusely and luxuriantly. The other plant to record for Surrey, *Silene dubia*, I found on the chalk downs above Reigate, a range that produces *Galium asperum* (*sylvestre*) and *Salvia pratensis*. It may be well to mention here that since recording the "single plant" of this latter in Journ. Bot. 1902, 411, I have found four or five more examples scattered over the downs, and three plants at least flowered this year. The *Silene* is fully described in Journ. Bot. 1905, 128, where it is mentioned that some authors prefer to call it a subspecies or variety of *S. nutans*, a species so far unknown in Surrey, although occurring in the adjoining county of Kent. The Surrey *S. dubia* seems slightly more hairy than the plants I have from Dungeness and Sandgate (Kent), and Bevendean (Sussex).—C. E. Salmon.

Geranium pratense × Robertianum.—On August 20th we found on the carboniferous limestone in Lathkil Dale, Derbyshire, a Geranium growing in company with *G. pratense* L. and *G. Robertianum* L., which was obviously a hybrid between the two. *G. pratense* was exceedingly abundant in the neighbourhood, occurring in masses fifty square yards or more in area, while on the outskirts of these patches *G. Robertianum* grew more sparingly but still quite plentifully. One plant was found presenting the general habit of a small *pratense*, but differing very markedly from that species in its flowers. Unfortunately there were only two perfect flowers remaining, the others having shed their petals. These two flowers, although borne on the same plant, differed considerably. One was practically a very tiny *pratense* flower, about half-an-inch in diameter, with petals of the characteristic blue; the other had narrower petals, about the size of those of *Robertianum*, but oval-acute in outline and with a very short claw. The calyx was open like that of *pratense*, and did not form a tube enclosing the claws of the petals as in *Robertianum*. The fruits were all sterile. The following is a description:—Stem erect, glandular-hairy, hairs spreading above, deflexed below. Leaves palmate, 7-lobed, lobes cut and serrate. Sepals spreading, awned, glandular-hairy. Flowers about ½ in. in diameter, dimorphic; one kind with petals obovate, shortly apiculate, blue, without claw, and forming an open cup; the other kind with oval-acute pink petals, shortly clawed, and with pale well-marked veins, petals forming an open cup. Stamens in both flowers with triangular-ovate bases, anthers red. Carpels with glandular hairs, sterile in every case.—E. & H. Drabble.

NOTICE OF BOOK.

Essays on Evolution, 1889–1907. By Edward Bagnall Poulton, Hope Professor of Zoology in the University of Oxford, &c. Pp. xlviii, 479. Oxford: at the Clarendon Press. 1908. 12*s.* net.

Professor Poulton is known as one of the most whole-hearted champions of Darwinism, in the strict sense of the term, who holds to Natural Selection as the greatest factor in the process of evolution. In the various papers here collected, which first appeared at different periods within the dates specified in the title, he treats of many topics connected with the subject:—The Age of the Earth, the real nature of Species, Theories of Evolution and Heredity, the late Professor Huxley's attitude towards Natural Selection; and, in a special manner, Mimicry and its bearing upon the same. In an interesting introduction he runs a tilt against other systems—such as Mendelism, and the Mutationism of De Vries—in which some are inclined to find a substitute for pure Darwinism. This is one of the most important portions of the book, but without expressing any opinion as to the merits of the controversy, we must be allowed to regret the fierce polemical, and even personal, tone which his remarks frequently assume. Although it has to be admitted that such a style of conducting controversy is not confined to one side, it will hardly be said that it contributes to the dignity of science, or exhibits that serene and dispassionate temper which the scientific atmosphere is supposed to infuse; while occasionally it even makes the argument less clear than might be desired for the sake of the ordinary reader.

Amongst the various and diversified subjects treated, it is obviously impossible within these limits to treat of all, and we may confine ourselves to that of Mimicry, which in a very special manner Professor Poulton has made his own, and in regard of which he can speak with great authority, while the facts he gives are in the highest degree both curious and instructive.

Two different things are frequently comprehended under the same term, namely, "Protective Resemblance" and "Mimicry" properly so called. Remarkable examples of the former are afforded by the well-known leaf butterflies of the genus *Kallima*, the under side of whose wing so carefully counterfeits the appearance of a dead leaf as actually to simulate a hole through its substance, a transparent "window" letting the light pass through as though there were nothing in the way. More than this: the effect of light shining through a semicircular rent, such as is frequently found in fragments of dead leaf, is sometimes to be recognized as represented by bright strongly reflecting "body-colour," while the outlines of the wing suggests weather-beaten relics of foliage, deeply notched and ragged, the posterior legs of the insect at rest making it seem to be hanging by two denuded fibro-vascular veins.

Mimicry proper is between different living creatures, usually lepidopterous insects—butterflies and moths. As expounded by Bates, author of *The Naturalist on the Amazons*, its originator, the theory of Mimicry was that some butterflies being found toothsome morsels by birds and other creatures, and others being found nauseous, and so left alone, the former had gradually, under the operation of Natural Selection, assumed the likeness of the latter, and so shared their immunity. Further observation has, however, revealed a great difficulty in the fact that not unfrequently the nauseous species mimic one another, and to meet this Müller introduced the further explanation that such display of "warning colours" on a large scale conduces to the more speedy education of the birds, and teaches them rapidly to avoid all insects displaying this uniform. This does not, however, remove all difficulties. The Batesian theory postulates that the mimicked species should be far more numerous in any region than their imitators, which is not always the case, and, which is still more curious, some of the unpalatable "mortels," as *Heliconidæ*, actually mimic their palatable imitators, as *Pieridæ*. Another circumstance not easy of explanation is that Mimicry is often confined to one sex, usually but not always the female.

Even the Müllerian theory can, with difficulty, be made to fit in with these and other phenomena, and Professor Poulton would accordingly enlarge it in a rather complicated manner. He divides colours into three classes: *Apatetic*, which resemble the environment or the appearance of another species; *Sematic* (warning and signalling colours); and *Epigamic* (colours displayed during courtship). As further subdivisions we have *Cryptic* colours, including *Procryptic* (Protective Resemblances) and *Anticryptic* (Aggressive Resemblances), *Aposematic* (Warning Colours), *Episematic* (Recognition Markings), *Pseudosematic* (Protective Mimicry), and *Pseudepisematic* (Aggressive Mimicry and Alluring Coloration).

How all this complex colour-scheme works out in theory, readers must be left to learn from Professor Poulton himself, but in spite of the ingenuity and the wide knowledge of the subject exhibited by him, we must be allowed to doubt whether any man can hope to track the ways of nature successfully through so intricate a labyrinth, and whether there may not more probably be some law yet undiscovered by science which would afford a far more simple and satisfactory explanation.

That there *is* a law governing the bewildering phenomena of Mimicry there can be little doubt; that they can all be explained, as our author believes, by Natural Selection alone, seems to us, at least, quite inconceivable.

J. G.

We regret to record the death of Mr. Arthur Lister, F.R.S., which took place at Lyme Regis on July 19. We hope to publish a fuller notice in an early issue.

BOOK-NOTES, NEWS, &c.

The Lichen Exchange Club of the British Isles has just published its first annual report—a commendable record of good work done, the greater part of which has been undertaken by Rev. H. P. Reader, the distributor. The members have increased to the number of twenty-seven, though probably all are not equally active collectors, and the Club shows promise of a long and useful existence. Lichenologists wishing to join the Club should communicate with the Secretary, Mr. A. R. Horwood, Corporation Museum and Art Gallery, Leicester. The subscription is 5s. per annum.

In the August number of the *Irish Naturalist* Mr. A. R. Horwood publishes a plea for the evicted cryptogams of Ireland. He enumerates the different agents that effect their disappearance, these being mainly climate, which we cannot control, and the spread of civilization (drainage, cultivation, &c.) with which we do not desire to interfere, for is not a man better than a cryptogam? The only activities that should be checked are those of the commercial hawker, who grubs up ferns wholesale, and the rapacious amateur collector. To meet their case, a Wild Flower Protection Act extending to ferns and other cryptogams has been advocated. The smoke nuisance and river pollution might also be dealt with, but for these evils attendant on civilization we really want more civilization. Until that arrives it is desirable that we should save our rare plants, though their rarity rather indicates that their struggle to obtain and preserve a footing in the country has been severe and not very successful.

The following notice of Henry Bromwich, who contributed a short note on Warwickshire plants to this Journal for 1874 (p. 112) is taken from the Report for 1907 of the Botanical Exchange Club:—"Henry Bromwich, eldest son of Wm. Bromwich, gardener, was born at Warwick on Mar. 10, 1828, and died in the adjoining parish of Milverton on May 28, 1907. He was early interested in Botany, and while young took a number of prizes for his collections of wild flowers at the local horticultural shows. He was for some years gardener at Wroxall Abbey, the seat of Miss Wren (a descendant of Sir Christopher Wren), where he gained much of his botanical knowledge, the neighbourhood, especially Yarningdale Common, being rich in uncommon species. For many years he was a member of the Botanical Exchange Club, and he rendered material aid, which is warmly acknowledged, to Mr. Bagnall, when preparing the *Flora of Warwickshire*. Mr. Bromwich also for some years was honorary curator to the Botanical Department of the Warwick Museum, to which institution he expressed a wish his own Herbarium should be given. In the Report of that Museum in 1904 the botanical collection is referred to as one of the best in the provinces, 'the Warwickshire plants are represented by a special collection, the work chiefly of Mr. Bromwich, a well-known and experienced local botanist, who still contributes to its further development.'"

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London: WEST, NEWMAN & CO., 54, Hatton Garden, E.C.

Plate 495 was inserted by mistake with the first part of Mr. Moore's paper on "Alabastra Diversa," instead of in this number.

No. 550 OCTOBER, 1908 Vol. XLVI

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BRITISH AND FOREIGN

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JAMES BRITTEN, K.S.G., F.L.S.

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ALABASTRA DIVERSA.—Part XVII.

By Spencer le M. Moore, B.Sc., F.L.S.

(Plate 495.)

(Continued from p. 298.)

Asclepias vomeriformis, sp. nov. Planta circa spithamea tubere ovoideo fulta, caule erecto compressiusculo crassiusculo paullo supra solum ramoso, ramis foliosis compressis secus lineas duas puberulis deinde glabris, foliis elongatis sessilibus subsessilibusve anguste linearibus apice mucronulatis leviter crassiusculis supra glabris subtus sparsissime piloso-puberulis in sicco lutescenti-viridibus, floribus pro rata submajusculis in umbellis paucifloris juxta apicem ramorum corymbosis dispositis, pedunculis quam folia brevioribus ut pedicelli corollam excedentes compressis et secus faciem unicam pubescentibus, bracteis parvis linearibus sursum attenuatis puberulis, calycis segmentis oblongo-lanceolatis breviter acuminatis extus pubescentibus, corollæ alte partitæ lobis ovato-oblongis obtuse acutis glabris demum late patentibus, coronæ phyllis a latere visis vomeriformibus gynostegium excedentibus basi gynostegio adnatis parte inferiori late oblonga facie sup. pubescente lateribus approximatis fac. inf. pubescentibus lobis lateralibus quam pars terminalis manifeste inferioribus triangularibus obtusiusculis ascendentibus parte terminali rotundata obtusissima nec dente nec cornu onusta, stigmate depresso 5-sulcato.

Hab. Madi, near Nimule; *Bagshawe*, 1612.

Tuber (sec. cl. detectorem) 10 × 4·5 cm. Folia 7–11 cm. long., 2–3 mm. lat., in sicco marginibus sæpe recurvis; costa media pag. inf. eminens. Umbellæ 3–5–floreæ. Pedunculi 1·5—2·5 cm. long.; bracteæ ± 3·5 mm. Pedicelli summum vix 3 cm. long., sæpe circa 2 cm. vel minus. Flores circa 3 cm. diam. Calycis segmenta 6 mm. long. Corollæ tubus 2 mm. long.; lobi 13 × 5 mm., supra viridi-rubescentes, subtus subvirides, albo-marginati. Coronæ phylla viridia, sursum punicea et rubro-punctata; pars basalis gynostegio adnata 1·5 mm. long., pars libera 1 cm. long., inferne 3·25 mm. lat.; lobi laterales 2 mm. long.; pars terminalis 4·5 × 5·5 mm. Antherarum alæ 4·25 mm. long.; loculi 2 mm. long. Pollinia lineari-oblonga, 1 mm. long.; caudiculæ pars proximalis spathulata, 2·5 mm. long., pars distalis filiformis pollinio æquilonga. Stigma 4 mm. diam.

To be inserted next *A. eminens* Schlechter: the large glabrous corolla-lobes and ploughshare-shaped leaves of the corona are two of the chief points of difference.

Cynanchum chirindense, sp. nov. Caule gracili volubili subdistanter folioso puberulo cito glabro, foliis petiolatis late oblongo-cordatis apice brevissime cuspidulato-acuminatis raro obtusissimis membranaceo-crassiusculis costa media pag. inf.

microscopice puberula exclusa glabris in sicco læte viridibus, floribus parvulis in umbellis pedunculatis paucifloris dispositis raro solitariis, pedunculis interpetiolaribus petiolo longioribus brevioribusve glabris, pedicellis flores longe excedentibus puberulis quam bracteæ subulatæ puberulæ pluries longioribus, calycis glabri segmentis lanceolatis acutis corollæ tubo æquilongis, corollæ rotatæ tubo lato glabro lobis tubum paullulum excedentibus ovato-oblongis acutis extus glabris intus pubescentibus, coronæ phyllis juxta basin columnæ insertis columnam ipsam excedentibus inter se liberis late oblongis obtusissimis intus carinatis carina vero nonnunquam subevanida crassiusculis, antherarum appendicibus brevissimis rotundatis supra stigma convexiusculum inflexis.

Hab. Rhodesia, Chirinda Forest at 3900 feet; *Swynnerton*, 137.

Caulis ad nodos pilosos leviter dilatatus. Folia adulta 6–8·5 cm. long., 3–5 cm. lat. (exstant minora verisimiliter immatura 2·5–5 × 1·2–2·2 cm.), glandulis immersis translucidis prædita; costæ secundariæ utrinque 4–5, ascendenti-patulæ, paullo ultra medium eleganter dichotomæ, pag. inf. magis aspectabiles; petioli ± 1 cm. long., crassiusculi, canaliculati, superne puberuli. Pedunculi nunc breves et revera 5 mm. vel etiam minus metientes, nunc comparate elongati, summum 2·7 cm. long. Bracteæ 1·25 mm. long., pedicelli ± 7·5 mm. Flores verisimiliter virides vel viridi-brunnei. Calycis lobi 1·5 mm. long.; glandulæ interpositæ filiformes, ·3 mm. long. Corollæ tubus 1·7 mm., lobi ægre 2 mm. long. Coronæ phylla 1·2 mm. long. Pollinia ovoidea, ·1 mm. long.

To be inserted next *C. schistoglossum* Schlechter, the leaves of which are differently shaped and stand upon longer stalks, the corolla is smaller and glabrous, the corona different, &c. Curiously enough, as is the case with *C. schistoglossum*, the coronal leaves differ slightly even on the same flower.

Marsdenia gazensis, sp. nov. Caule scandente sursum rari-ramoso ramulis crebro foliosis pubescentibus, foliis petiolatis ovatis vel ovato-oblongis apice breviter cuspidato-acuminatis basi late cordatis raro cordato-truncatis pergamaceis utrinque appresse pubescentibus, inflorescentiis quam folia manifeste brevioribus superne furcatis pubescentibus furcis umbellos cymasve e floribus paucis sistentes gerentibus, bracteis minutis late subulatis, pedicellis flores æquantibus vel paullulum excedentibus pubescentibus, calycis lobis ovatis obtusissimis dorso pubescentibus, corollæ sat alte 5-lobatæ lobis ovato-oblongis obtusis quam tubus intus fere glaber ter longioribus, coronæ phyllis basi gynostegio adnatis incrassatis parte basali dorso aliquanto carinato basi gibbo parte libera gynostegium leviter superante anguste ovato-oblonga obtusa sursum patente, antherarum appendicibus rotundatis obtusissimis stigma convexiusculum breviter impendentibus.

Hab. Portuguese East Africa, Kurumadzi River, Jihu; *Swynnerton*, 224.

Foliorum limbus 6–8 cm. long., 3·5–5 cm. lat., in sicco griseo-

viridis; costæ secundariæ utrinque 4–5, quarum jugum proximale stricte basale necnon patens, costæ reliquæ ascendentes; rete laxiuscule, fac. inf. solummodo aspectabile; petioli graciles, pubescentes, 2–3 cm. long. Inflorescentiæ sæpissime 2·5–5 cm. long., 2–3 cm. diam.; pedunculus communis 1–3 cm. long.; pedicelli ± 4 mm. long. Bracteæ circa 1 mm. long. Calycis lobi 2 mm. long. Corollæ in toto 4·2 mm. long.; tubus 1 mm. long., intus pilosulus; lobi 3·2 mm. long., summum 2 mm. lat. Coronæ phyllorum pars libera vix 1 mm. long. Pollinia linearioblonga, ·4 mm. long.; caudiculæ inflexæ, ·25 mm. long., glandulæ anguste trianguli æquilongæ.

The principal features distinguishing this from *M. racemosa* K. Schum. are the narrower leaves less deeply cordate at the base, the larger calyx and corolla, and the coronal lobes with a broad obtuse not subulate and acute free portion.

Telosma unyorensis, sp. nov. Caule volubili tereti, ramulis crebro foliosis puberulis mox glabris, foliis ovato-oblongis apice cuspidato-acuminatis basi nonnunquam obliquis rotundatis obtusissimisve petiolis quam se ipsa manifeste brevioribus suffultis membranaceis utrobique in nervis microscopice puberulis in sicco viridibus, cymis interpetiolaribus brevipedunculatis pluriforis, pedunculis pedicellisque puberulis, calycis segmentis oblongo-lanceolatis acutis vel obtusiusculis extus puberulis, corollæ tubo extus sparsim puberulo deorsum ovoideo sursum coarctato lobis oblongo-linearibus apice paullo dilatatis tubum breviter excedentibus, coronæ phyllis antheras superantibus oblongo-quadratis obtusissimis crassiusculis appendice lineari-lanceolata acuta subapicali præditis, antherarum appendicibus anguste ovato-oblongis obtusis.

Hab. Unyoro, near Mruli, Victoria Nile; *Bagshawe*, 1558.

Folia sæpissime 5·5–6·5 × 2·5–3·5 cm., fac. sup. magis vivide colorata; costæ secundariæ utrinque 4–5, apertissime arcuatæ; petioli 1–2 cm. long. Cymæ circa 2–5 cm. diam. Pedunculi vulgo 3–5 mm. long., sat validi, sæpe patentes recurvive. Bracteæ lineares, circa 1 mm. long. Pedicelli ± 5 mm. long. Flores subvirides. Calycis segmenta 4 × 2·2 mm., ciliolata. Corollæ tubus ægre 6 mm. long., inferne 3·2 mm. superne (ubi intus villosus) 2·3 mm. lat.; lobi 8 mm. long., infra apicem torti, patentissimi. Coronæ phylla 2·2 mm. long.; horum appendix 1·2 mm. long. Antherarum appendices fere 1·5 mm. long. Pollinia oblongo-pyriformia, ·6 mm. long.

Differs from *T. africana* N. E. Br. chiefly in the narrow calyx-segments, the smaller corollas with ovoid (not globose) lower part of the tube and narrower lobes, and the smaller coronal leaves with their appendix arising just below the tip instead of half-way down or nearly so.

For the adoption of the generic name *Telosma*, see N. E. Brown in Fl. Cap. iv. Sect. i. p. 776.

Swynnertonia, *Asclepiadearum* e tribu *Marsdenieearum* genus novum. (Plate 495 A.)

Calyx alte 5-partitus, intus glandulis 5 cum segmentis alternantibus præditus. Corolla majuscula rotata alte 5-partita lobis comparate angustis æstivatione contortis dextrorsum obtegentibus. Corona duplex ex apice columnæ stamineæ oriunda, phylla exteriora 5, corollæ lobis opposita apice emarginata, phylla interiora quam exteriora longiora et cum iiś alternantia basi antherarum dorso adnata antheras longe excedentia. Stamina ima basi corollæ inserta; filamenta connata, antheræ erectæ, membrana brevi lata erecta terminatæ. Pollinia quoque in loculo solitaria ascendentia caudiculis brevibus suffulta. Stigma crassiusculum vertice leviter depressum, folliculi ——. Frutex volutilis, glaber. Folia ampla, opposita. Cymæ axillares, pedunculatæ, subumbellatæ, bracteatæ, paucifloræ.

Swynnertonia cardinea, sp. unica. Caule compressiusculo dein subtereti, distanter folioso, foliis petiolatis late oblongo-ovatis apice subito breviter acuminatis basi late rotundatis raro levissime cordatis membranaceis, pedunculis petiolos æquantibus vel ab iis superatis, cymis 4–5-floris, bracteis lineari-subulatis acutis, pedicellis filiformibus flores excedentibus, calycis segmentis angustissime lineari-lanceolatis acutis, corollæ lobis calycem multo excedentibus lineari-lanceolatis acutis margine sparsim pilosis apice longe barbatis basi pilis elongatis glandulosis pupureis onustis, coronæ phyllis exterioribus oblongis quam phylla interiora lyrato-oblonga apice breviter bicornuta duplo brevioribus phyllis omnibus microscopice puberulis margineque ciliatis, antherarum appendicibus rotundatis obtusissimis stigma breviter superantibus.

Hab. Rhodesia, Chirinda Forest, 3700–4000 ft.; *Swynnerton*, 1080.

Folia adulta 8–10 cm. long., 5·5–7·5 cm. lat.; costæ secundariæ utrinque 4–5, apertissime arcuatæ, pag. utraque facile aspectabiles; petioli 2–2·5 cm. long., juxta basin sæpe volubiles. Pedunculi 1·5 cm. rarius 2 vel etiam 2·5 cm. long. Cymarum axis ± 5 mm. long.; hujus bracteæ circa 2 mm. long. Florum rite evolutorum pedicelli 3–3·5 cm. long. Calycis segmenta 4 mm. long. Corollæ lobi basi dilute flavi, sursum olivacei 15–18 mm. long., horum pili usque ad 4 mm. long. Columna staminea nuda basi aliquantulum ampliata, 2·2 mm. long. Coronæ phylla exteriora 1·5 mm., interiora 3 mm. long.; horum cornua ·3 mm. long. Antherarum loculi ·45 mm., appendix ·4 mm. long. Pollinia pyriformia, ·3 mm. long. Ovarium oblongum, 3 mm. long. Stigma fere 1 mm. diam.

This genus differs from all African ones of the tribe *Marsdenieæ* in having a double corona, of which both series arise from the staminal column. In this character it approaches *Tenaris* and *Brachystelma* of the tribe *Ceropegieæ*, but the habit, the æstivation, and the form of the corona are different in those genera.

The specific name refers to a peculiarity of the corolla-lobes;

these, as Mr. Swynnerton notes, fall downwards on being moved into a new position, as if they were provided with a hinge.

Ceropegia mazoensis, sp. nov. Caule basi incrassato et radices simplices crassas emittente sursum volubili distanter folioso crassiusculo glabro, foliis subsessilibus vetustioribus elongatis anguste lineari-oblongis obtusis junioribus brevioribus necnon angustioribus omnibus leviter crassiusculis rarissime piloso-ciliatis ceterum glabris, floribus mediocribus subumbellatis inflorescentiis solitariis paucifloris, pedicellis tenuibus quam bracteæ subulatæ pluries longioribus, calycis segmentis lineari-lanceolatis sursum attenuatis apice acutis, corollæ extus glabræ intus prope medium pilosæ ceteroquin glabræ tubo deorsum sat amplo ovoideo dimidio superiore comparate angusto cylindrico faucibus haud dilatato lobis tubum circa æquantibus linearibus apice connatis, coronæ phyllis exterioribus in cupulam brevem undulatam connatis interioribus lineari-oblongis obtusis erectis antheras bene excedentibus basi cupulæ adnatis, antheris erectis late oblongis obtusis stylum conoideum leviter superantibus, folliculis linearibus apicem versus attenuatis apice ipso truncatis et nigro-induratis.

Hab. Rhodesia, Mazoe, 4700 ft.; *Eyles*, 518.

Folia vetustiora 10–17 cm. long., 4–7 mm. lat., juniora sæpissime 3–7 × 2–3 mm., omnia glandulis immersis lucentibus inspersa. Inflorescentiarum axis 2–7 mm. long.; bracteæ circa 1 mm. long. Pedicelli circa 5 mm. long. Calycis segmenta 2·5 mm. long. Corolla tota 2·7–3 cm. long.; tubus viridis, 1·5 cm. long., inferne summum 4 mm. lat., superne 2·2 mm.; lobi flavi, ægre 1 mm. lat. Coronæ cupula ·3 mm. alt.; phylla interiora 2 mm. long. Antheræ ·6 mm. long. Pollinia subglobosa, ·25 mm. diam. Folliculi circa 15 cm. long., 2–3 mm. lat. Semina lineari-oblonga, levia, rubro-brunnea, 5 mm. long., horum coma circiter 1·5 cm. long.

Very like *C. stenantha* N. E. Br., but different from it in the leaves, the sessile inflorescences, longer corollas and corona.

Ceropegia hispidipes, sp. nov. Caule volubili deorsum subcrebro sursum distanter folioso hispidulo-pubescente, foliis breviter petiolatis anguste lineari-lanceolatis acutis breviterve acuminatis junioribus plane angustioribus etsi sæpe vix brevioribus omnibus basi obtusis membranaceis utrinque pilis strigillosis sat crebris obsitis, umbellis sessilibus vel brevissime pedunculatis circa 6-floris ut pedicelli tenues bracteas filiformes longe superantes pilis hispidis patentibus copiose præditis, calycis segmentis subfiliformibus apice acutis basin versus amplificatis hispidis, corollæ tubo ima basi attenuato hinc dilatato cylindrico sub faucibus paullo coarctato utrinsecus glabro lobis tubum circa semiæquantibus oblongis replicatis apice connatis extus puberulis, coronæ phyllis exterioribus fere apice columnæ staminеæ enatis abbreviatis bilobis lobis deltoideis obtusis phyllis interioribus anguste oblongo-linearibus obtusis conniventibus antheras minimas oblongas obtusas longe excedentibus.

Hab. Rhodesia, near Chirinda, at 3800 ft.; *Swynnerton*, 1137.

Folia longitudine 8 cm. attingentia, sæpissime vere breviora, sc. 5–6 cm. long., 5–10 mm. lat., juvenilia modo 3 mm. lat., glan-

dulis pellucidis sparsim inspersa; costa media supra impressa subtus prominens, costulæ fac. sup. subevanidæ; petioli ± 5 mm. long. Bracteæ 3–4 mm. long., pedicelli ± 12 mm. Calycis segmenta 8 mm. long. Corolla in toto ægre 2 cm. long.; tubus 12 mm. long., juxta medium 4 mm. lat., ima basi 1·25 mm., sub faucibus 2·75 mm.; lobi 7 mm. long. Columna staminea 1·2 mm. long. Coronæ phylla exteriora ·25 mm. long., interiora crassiuscula, 1·2 mm. long. Antheræ ·15 mm. long.

Differs from *C. leucotænia* K. Schum. in the narrowly linear-lanceolate leaves on short petioles, the longer corollas somewhat diversely shaped, the broad lobes of the outer coronal leaves, the obtuse not clavate tips to the leaves of the inner corona, &c.

Mr. Swynnerton notes that the corolla is striped inside with black and palest greenish yellow. The coronal lobes and anthers are apparently black in the fresh state.

Ceropegia saxatilis, sp. nov. Caule volubili sparsim folioso pubescente, foliis breviter petiolatis ovatis obtusis basi cordatis rotundatisve utrobique pubescentibus vel saltem puberulis, floribus mediocribus in umbellis solitariis sessilibus pubescentibus 1–4-floris digestis raro racemosis, bracteis subulatis quam pedicelli pubescentes multo brevioribus, calycis segmentis angustissime lineari-lanceolatis sursum attenuatis apice acutis, corollæ extus pubescentis intus sparsissime pilosulæ tubo inferne dilatato subcylindrico (sursum leviter angustato) quadrante superiori coarctato limbi lobis abbreviatis oblongis replicatis apice connatis, coronæ phyllis exterioribus prope apicem columnæ staminеæ impositis rotundatis integerrimis interiora linearia subconniventia antheras longe excedentia semiæquantibus, antheris oblongis stigma impendentibus, folliculis comparate brevibus linearibus sursum gradatim attenuatis apice obtusis.

Hab. Portuguese West Africa, Kubango, east of R. Kutchi, in shade amongst huge granite boulders; *Gossweiler*, 2439.

Folia adulta 3–4 cm. long., 2–3·5 cm. lat., tenuiter membranacea; petioli circa 5 mm. long. Pedicelli ± 1·5 cm. long. Calycis segmenta circa 5 mm. long. Corolla in toto 2·8 cm. long.; tubi pars dilatata 17·5 × 6–7 mm., pars contracta 5·5 mm. long., 2 mm. lat.; lobi 5 mm. long. Coronæ phylla exteriora ·7 mm. long., ·6 mm. lat.; interiora 1·2 mm. long. Antheræ ·3 mm. long. Pollinia oblongo-pyriformia, ·15 mm. long. Folliculi 6·5 cm. long., circa 3·5 mm. lat., in sicco griseo-virides. Semina oblonga, brunnea, 5 mm. long., horum coma 2 cm. long.

The affinity of this is with *C. papillata* N. E. Br., but, among other features, its leaves are differently shaped, the lower three-fourths of the corolla-tube is dilated instead of the dilatation being confined to the base, and the leaves of the outer corona are rotundate and entire, not linear and bifid.

Scrophulariaceæ.

Buchnera pusilliflora, sp. nov. Annua, erecta, spithamea vel paullo ultra, caule simplici gracili tetragono hispidulo subdistanter folioso, foliis radicalibus parvis sessilibus ovatis obtusis

trinervibus hispidulo-scabridis, foliis caulinis sat elongatis anguste linearibus obtusis vel obtuse acutis hispidulo-scabris, floribus parvulis in spicis densis abbreviatis raro in spica longiore (sc. floribus inferioribus inter se subdistantibus) dispositis, bracteis linearibus vel lineari-lanceolatis acutis infimis calyces bene excedentibus reliquis ab his superatis ut bracteoli parvuli subulati hispidis, calycis hispidi lobis 5 subulatis quam tubus plane brevioribus, corollæ tubo calycem excedente extus piloso-hispidulo faucibus levissime coartatis lobis oblongis obtusis inter se fere æqualibus, staminibus paullo infra medium tubum insertis, antheris acuminatis, stylo sursum incrassato, capsula anguste ovoideo-oblonga glabra.

Hab. Mazoe, in open dry vlei; *Eyles*, 367.

Internodia sæpissime 2·5–4 cm. long. Folia radicalia 1·5–1·7 cm. long., circa 7 mm. lat.; caulina ± 2·5 cm. long., 2 mm. lat. vel minus, folia omnia ut inflorescentia in sicco nigricantia. Spicæ 1–1·5 cm. long., corollis exemptis 5 mm. lat., spica unica 4·5 cm. long., cujus flores infimi intersunt 5–10 mm. Bracteæ imæ 5–7·5 mm. long., juniores 2·5–3 mm. Bracteolæ circa 1·25 mm. long. Flores cærulescentes. Calyx totus circa 4·5 mm. long., humectatus 1 mm. lat.; lobi 1·5 mm. long. Corollæ tubus 6·5 mm. long., inferne ·8 mm. faucibus ·6 mm. lat.; lobi 2·2 mm. long. Filamenta 1 mm. long., antheræ vix totidem. Ovarium 1·2 mm. long., stylus 1·5 mm. Capsula 4·5 mm. long.

Differs from *B. Randii* S. Moore chiefly in the lowlier habit, markedly less hispid spikes, different bracts and bracteoles, and narrow corolla-lobes.

Eylesia, *Scrophulariacearum* e tribu *Gerardiearum* genus novum.
(Plate 495B.)

Calyx bilabiatus, 5-nervis; labium anticum bilobum, posticum lobo superiori obsoleto itaque bilobum. Corollæ tubus tenuis, calyce multo longior, sursum incurvus; limbus subregularis, lobi antici 3 quam postici 2 paullo longiores. Stamina 4, didynama, basin versus tubi inserta, inclusa; antheræ uniloculares, dorsifixæ, sursum attenuatæ. Stylus brevis, aliquantulum obliquis, stigmate clavato coronatus. Ovarii loculi ∞-ovulati. Capsula loculicide dehiscens, ejus valvæ coriaceæ. Semina numerosa, parvula, oblonga. Herba annua, parva, erecta, in sicco nigra. Folia angusta, integra, summis perpaucibus alternis exemptis opposita. Flores pusilli, in spicam terminalem brevem conferti, quisque bractea comparate ampla bracteolisque duabus stipatus.

Eylesia buchneroides, sp. unica. Caule tenui simplici vel rarissime ramoso subobsolete scabriusculo, foliis sessilibus linearibus obtusis utrinque scabridis, spicis longipedunculatis ipsis quam folia brevioribus fere omnino glabris, bracteis cymbiformibus ambitu ovatis acuminatis margine rigide ciliatis, bracteolis calycem fere æquantibus anguste lineari-lanceolatis acutis ciliatis, calycis labiis tubum excedentibus usque ad medium in lobos subulatos divisis, corollæ extus glabræ intus puberulæ faucibus pubescentis

tubo deorsum amplificato sursum angustato lobis oblongis obtusissimis, ovario anguste ovoideo-oblongo compresso glabro, stylo quam ovarium manifeste breviore stigmate paullulum longiore, capsula oblongo-ovoidea calyci circa æquilonga.

Hab. Rhodesia, Mazoe, in open dry vlei, associated with *Buchnera pusilliflora*; *Eyles*, 366.

Planta spithamea vel sesquispithamea. Folia 1·5–3·5 cm. long., 1–1·5 mm. lat. Pedunculi 6·5–13·5 cm. long. Spicæ 7–20 mm. long., basi 5 mm. superne 3–3·5 mm. lat. Bracteæ 4·25 mm. long. Bracteolæ 2·5 mm. long. Flores purpurei. Calyx totus 3 mm. long; tubus 1 mm., labia 2 mm.; horum lobi 1 mm. long. Corollæ tubus 4 mm., inferne 1 mm. superne ·4 mm. lat.; limbi lobi antici 1·7 mm. postici 1·25 mm. long. Antheræ ægre 1 mm. long. Ovarium fere 2 mm., stylus ·8 mm., stigma ·5 mm. long. Capsula 2·25 × 1·5 mm.

The genus is closely allied to *Buchnera*, the chief characteristic being the curious 2-lipped calyx.

Acanthaceæ.

Brillantaisia (§ Stenanthium) **Bagshawei,** sp. nov. Caulibus abbreviatis e rhizomate repente frequenter radicante oriundis simplicibus paucifoliatis tetragonis minute puberulis, foliis profecto evolutis comparate magnis ovatis superne caudato-acuminatis apice obtusis e basi rotundata in petiolum sursum alatum subito desinentibus margine undulatis vel summum breviter dentatis membranaceis utrinque costis ordinis 1 et 2 fac. inf. puberulis exemptis glabris, floribus pro rata parvulis in spica abbreviata pauciflora dispositis, bracteis late ovatis obtusis margine ciliatis, bracteolis oblongo-ovatis obtusis utrinque piloso-puberulis margine ciliatis, calycis bracteolas subæquantis glanduloso-hispiduli lobis superne haud dilatatis lobo postico quam reliqui paullo longiore ac latiore, corollæ tubo calycem paullulum superante superne leviter coartato faucibus subito dilatatis labiis tubum excedentibus labio antico late quadrato-oblongo postico antico paullo longiore late oblongo, staminibus exsertis filamentis inferne piloso-puberulis, staminodiis valde abbreviatis, pollinis granorum costis verruculis paucis parvulis ornatis, ovulis pro loculo 7.

Hab. Bugoma Forest, Unyoro; *Bagshawe*, 1387.

Herba sec. specc. mihi obvia circa spithamea. Folia ± 10·0 × 8·0 cm., juvenilia vero sæpe modo 4·0–5·0 × 2·5–3·0 cm., glandulis minutissimis pellucidis inspersa, fac. sup. cystolithis linearibus copiosissime induta; costæ secundariæ utrinque 8–10, ascendenti-arcuatæ, fac. sup. planæ, inf. ut costa centralis crassiuscula aliquanto eminentes; petioli adusque 3·5 cm. long., sub limbo circa 1·0 cm. lat. Spica 2·0 cm. long. Bracteæ adultæ circa 1·0 × 0·8 cm. Bracteolæ 0·75 × 0·4 cm. Flores purpurei. Calycis lobi 0·6–0·65 × 0.04–0·05 cm.; lobus posticus 0·75 × 0·08 cm. Corollæ tubus 0·8 cm. long., inferne 0·25 cm. superne 0·2 cm., faucibus 0·25 cm. lat.; labium anticum 1·15 × 0·7 cm.; lobi 0·2 cm. long.; labium posticum 1·4 × 0·5 cm.; lobi 0·15 cm. long. Filamenta

1·2 cm. long., antheræ 0·3 cm. ; staminodia capitellata, 0·2 cm. long. Ovarium 0·4 cm., stylus glaber, 1·3 cm. long.

Differs from *B. verruculosa* Lindau chiefly in leaves, short inflorescences, ovate bracteoles, short calyx-lobes, purple (not white) corollas with a shorter tube, and greatly reduced staminodes.

Of *B. nyanzarum* Burkill, reported recently from the Semliki Valley, Ruwenzori (Journ. Linn. Soc. xxxviii. p. 270), Dr. Bagshawe sends fine specimens from the Budongo Forest, Unyoro (no. 1506).

Explanation of Plate 495.

The figures are enlarged unless otherwise stated.

Fig. A. 1. *Swynnertonia cardinea.* View of portion of a specimen (nat. size). 2. Staminal column with outer and inner corona. 3. A pair of pollinia. B. 1. *Eylesia buchneroides.* The plant (nat. size). 2. A flowering spike. 3. A flower with its two bracteoles and two-lipped calyx. 4. Lower part of corolla-tube opened to show the four 1-celled anthers. 5. Ovary with style and stigma.

NOTES ON 'THE LONDON CATALOGUE,' ED. 10.

By the Rev. E. S. Marshall, M.A., F.L.S.

(Concluded from p. 289.)

1280. Rhinanthus major Ehrh. Var. *platypterus* Fr. is anomalous in the genus, and a rare form ; so I have taken *stenopterus* Fr. as the type, following Sterneck.

1282. R. Perrieri Chabert. This is quoted by Sterneck in his monogtaph as a synonym of his *Alectorolophus rusticulus*, and presumably antedates it.

1290. Melampyrum pratense L. c. ericetorum Oliver. As far as book-characters go, the Wybunbury Bog (Cheshire) plant answers much better to this than to var. *montanum* Johnst., which is also a predominantly alpine or subalpine form ; but I have seen no Irish specimens. It is associated with *Oxycoccus* at Wybunbury.

1328. Thymus Chamædrys. The paper on *Thymus* by Dr. Domin and Mr. Jackson (*Journ. Bot.* 1908, 33) appeared too late for us to use it.—b. *lanuginosus* (Schk.) of the *Catalogue* rests on material sent to me fresh by Mr. E. W. Hunnybun from the Gogmagogs (chalk downs) near Cambridge; it agrees well with Koch's description, and Mr. Bennett endorsed the name.

1352. Stachys annua L. Objection has been taken to the starring of this species, which is mostly a casual ; but, as is mentioned in the *Flora of Kent*, it has occurred there abundantly on open downs at a distance from cultivation, and may even be native.

1360. Lamium mollucellifolium Fr. This is misspelt in the text. The refusal to admit *L. intermedium* Fr., published *simultaneously* as a better name, strikes me as most arbitrary—a

typical instance, in fact, of what has been called "nomenclature by dogma."

1378. PLANTAGO MARITIMA L. b. LANATA Edmondston. I have seen this in Orkney, and regarded it as a mere state, due to exposure and salt-laden winds; a similar modification of another species grew with it. Add c. *pumila* Kjellm. and d. *minor* Hook. & Arn.

1382. HERNIARIA GLABRA L. b. SUBCILIATA Bab. was omitted, as the Cornish plant so named has recently been referred to *H. ciliata*. I possess, however, a sheet collected at Bel Royal, Jersey, by Dr. Playfair, which, while clearly nearer to *H. glabra*, is decidedly ciliate. It may very likely be a hybrid, as it appears to be perennial; and the same hybrid may have been the plant intended by Babington's description.

1436 *bis*. Insert *POLYGONUM SAGITTATUM L.—I. An unfortunate and quite unintentional omission.

1443. RUMEX LIMOSUS Thuill. is classed by Mr. Druce as a hybrid (*conglomeratus* × *maritimus*). Against this must be set the following facts: it produces abundance of normal fruit, and in three Somerset stations known to me no *maritimus* is to be seen. As a rule *Rumex* hybrids are barren, at least in great measure.

1447. R. DOMESTICUS Hartm. There is no doubt about this name, whereas *R. aquaticus* L. is usually referred to *R. Hippolapathum*.

1471. EUPHORBIA CYPARISSIAS L. Its probable status near Dover is discussed in *Flora of Kent*, p. 308. *E. Lathyrus* appears to be a true native in Monmouth, N. Somerset, Northampton, and perhaps Kent.

1488. BETULA ALBA L. The short description in *Spec. Plant.*, "foliis ovatis acuminatis serratis," is, I consider, decisive in favour of its identification with *B. verrucosa* Ehrh.; I have never seen truly acuminate leaves in the following species, but they are so in all the *verrucosa*-specimens that I have met with.

1489. B. TOMENTOSA Reit. & Abel. Respecting b. *denudata*, I was in a position of difficulty, some of my Scottish gatherings having been named *B. odorata* var. *carpathica* by Prof. Lange. On consulting Regel in DC. *Prodromus*, I felt very doubtful about our having true *carpathica*, and accordingly retained the varietal names of the ninth edition, with the substitution of my own name as the authority for them; as, indeed, I was almost obliged to do under the altered species-name.

1501. SALIX ALBA × TRIANDRA. The census-number (19) dropped out by some printing accident; it appeared duly in the final proof.

1507. UTRICULARIA INTERMEDIA × MINOR. Prof. Trail of Aberdeen has thus determined a barren plant of mine from Lochan Feoir, Assynt, W. Sutherland, I think correctly; he considers the Scandinavian *U. ochroleuca* R. Hartm. to be this hybrid.

1515. S. HERBACEA L. Insert × *phylicifolia* (*Moorei*, Wats.).—I.

1518. POPULUS TREMULA L. b. VILLOSA. The author is (O. F.) Lang, not Lange, and was entered accordingly; but somebody has altered it.

1525. TAXUS BACCATA L. The census-number is 52.

1545. HELLEBORINE LATIFOLIA Druce b. MEDIA. The plant of Babington (and Fries?) appears to be only a subspecies, and is so treated here.

1547. H. ATROVIRIDIS W. R. Linton. The last letter which Mr. Linton wrote to me conveyed his assent to this naming. I believe that I have the plant from him (near Buxton), under the name of *Epipactis atrorubens*; gatherings of my own from the Wynd Cliff, Monmouthshire, and near Clonbur, E. Mayo, are at least very near it, but dried specimens are difficult to name with certainty.

1583. ROMULEA COLUMNÆ Seb. & Maur. Mr. Davey has informed me of its discovery in E. Cornwall.

1585. SISYRINCHIUM CALIFORNICUM Ait. Mr. Druce's theory of this plant's introduction is worthy of careful consideration. I venture to dissent from it on the following grounds:—1. The station is a swampy pasture, beyond the reach of spring tides, and with an otherwise native and characteristic marshland flora. 2. Carnsore Point, the scene of so many wrecks, is a good way off, and there are some miles of intervening coast on which floating seeds could more easily be deposited. 3. So far as I know, this species is purely paludal, not agrestal; and how its seeds could find their way into Californian cornfields I cannot understand, these fields being (as I remember) normally much drier than those of our own country. I am still of opinion that it will probably be found elsewhere in Ireland. It should be borne in mind, moreover, that for a long time *S. angustifolium* lay under suspicion. Mr. Scully, who is by no means prone to undue credulity in such matters, paid me a short visit just before Easter, and I understand that he now fully accepts it as a native in Kerry. *Leucojum æstivum* was likewise objected to when I first recorded it from Co. Wexford; it has since been found abundantly over a fairly large area in Connaught, and is considered to be indigenous there by so careful a botanist as Miss M. C. Knowles.

1587. NARCISSUS PSEUDO-NARCISSUS L. b. LOBULARIS. Haworth published this as a species under *Ajax*, I believe; I do not know who is the earliest authority for it as a variety.

1598. ASPARAGUS MARITIMUS Mill. This name was adopted in deference to Messrs. Rendle and Britten's opinion. I do not believe, as the result of personal observation, that there is even a true *varietal* distinction between this and *A. officinalis* L. ("*altilis*"). Where the plant grows on open coasts and other exposed situations, it is more or less prostrate; but as soon as it is sheltered it becomes ascending or erect, the difference being simply a matter of situation. See Lloyd, *Fl. de l'Ouest*.

1636. JUNCUS COMPRESSUS Jacq. Add b. *coarctatus* Meyer.

1664. TYPHA LATIFOLIA L. var. MEDIA Syme. Mr. Druce makes this var. *ambigua* Sonder, an older name. He also gives *angustifolia* × *latifolia*. Have we, then, two different intermediate plants? It is not unlikely; for var. *media* Syme is said to be locally plentiful on Glastonbury peat-moor, N. Somerset, from which *angustifolia* now appears to be absent, though it may have grown there formerly.

1666. SPARGANIUM ERECTUM L. Mr. Druce enters this as *S. ramosum* "Huds." Curt., which is more definite, and, I think, preferable.

1669. S. AFFINE Schnizl. The application to this species of the name *S. natans* L. has been shown by Mr. Beeby (*Journ. Bot.* 1888, 115–6) to be untenable. We overlooked Mr. Beeby's record of *S. affine* × *simplex* from Shetland.

1680. ALISMA LANCEOLATUM With. The true plant is a distinct species, I believe.

1721. ZANNICHELLIA PEDUNCULATA Reichb. Mr. Druce calls this *Z. maritima* Nolte, which Nyman treats as a var. of *Z. pedicellata* (Wahlenb.) Fr. (*pedunculata* Reichb.).

1723. ZOSTERA MARINA L. b. STENOPHYLLA Asch. & Graebn. To this Mr. Ar. Bennett now refers the bulk of our narrow-leaved plants. When he wrote to me he had only seen true British var. *angustifolia* Hornem. from Orkney, but he has since identified with it (in herb. C. E. Salmon) a specimen of mine from Loch Fleet, E. Sutherland, gathered for *Z. nana*. I suspect that in some localities hybrids occur, but their determination must be a matter of much difficulty.

1728. ERIOCAULON SEPTANGULARE With. Mr. Clarke fortunately ascertained that this dates from Withering's first edition (1776), two years earlier than *Nasmythia articulata* of Hudson, ed. 2; Withering's name therefore stands.

1739. SCIRPUS FILIFORMIS Savi b. MONOSTACHYS. Add Clarke & Marshall (= *S. Savii* var. *monostachys* Hook. fil.). Mr. C. B. Clarke pointed out some years ago that *S. pygmæus* Kunth is a synonym of the species, not of the variety.

1753. ERIOPHORUM LATIFOLIUM Hoppe. I do not think that the application of the name *E. polystachion* L. to this plant is justifiable even on technical, still less on critical, grounds.

1766. CAREX INCURVA Lightf. b. ERECTA. The authority is (as I wrote it) Lang, not Lange.

1767. C. DIVISA Huds. b. CHÆTOPHYLLA Kükenth. (*C. chætophylla* Steudel). Mr. H. S. Thompson has informed me that Kükenthal so names a southern coast plant (from Sussex, I think).

1776. C. CONTIGUA Hoppe (MURICATA auct. angl.). There is no doubt about the meaning of this name. I now think the earlier *C. spicata* Huds. too uncertain, in the absence of specimens; "*in aquosis et ad margines fossarum*" does not fit the normal habitat of *contigua*, and I have never, to my knowledge, seen it in such

places, nor are Hudson's citations from old writers sufficiently precise.

1777. C. MURICATA L. (PAIRÆI F. Schultz). Besides the evidence of the type-specimen, the definition "capsulis acutis *divergentibus* spinosis" (the italics are mine) in *Sp. Plant.* appears to me decisive. Their patent fruit is a marked point about *C. Pairæi* and *C. Leersii*, as compared with *C. contigua*.

1783. C. CURTA Good. As Mr. Williams is contributing to *Journ. Bot.* a paper dealing with this species in detail, I will merely say now that Goodenough's name is antedated, and cannot be retained. *C. canescens* L. is untenable (if used at all, it should displace *C. divulsa* Good.); but *C. canescens* Lightf. (1777) appears to be valid. The *Catalogue* varieties will therefore stand as b. *robustior* Blytt and c. *fallax* F. Kurtz.

1790. C. GRACILIS Curt. d. GRACILESCENS. Kükenthal is, I think, the authority for this name, under *gracilis*.—e. *erecta* Kükenth. Herr Kükenthal ranks this as a subspecies, and has identified with it specimens gathered by me beside the Basingstoke Canal near Frimley, Surrey. It has not been previously published as British, and I have not seen his description.

1793. C. AQUATILIS Wahl. c. CUSPIDATA. Forms with cuspidate glumes occur in Scotland, but whether they are identical with the plant of Laestadius is doubtful; they may be hybrids with *salina*.

1820. C. DISTANS L. Var. *litoralis* And. is clearly a form or subvariety of the maritime var. or subspecies, *C. neglecta* Degl.

1829. C. ACUTIFORMIS Ehrh. Insert × *inflata*—1.

1833. "C. SAXATILIS L. f. DICHROA (Fr.)." It is clear from *Summa Veg. Scand.* pp. 70 (where *pulla* Good. is ranked as a variety) and 238 that Fries wished to substitute his own name for that of Linnæus: "Nomen Linnæanum certum, sed incongruum ut etiam C. pullæ, quia fructus typice pullescunt et virescunt (cfr. H. N. xi.), licet omnium facile specierum spicæ in alpibus infuscentur. Potius igitur *C. dichroa* dicenda." The pale-flowered form (*C. pulla* var. *dichroa* Blytt) is (I believe) rare in Scotland; I have lately received from Mr. Peter Ewing characteristic specimens gathered on Ben Heasgarnich, Mid-Perth, and a more intermediate plant from Ben Lawers.

1841. SPARTINA TOWNSENDI H. & J. Groves. If a hybrid, this must be surprisingly fertile; two or three years ago Mr. C. E. Salmon informed me that it had been discovered at New Romney, E. Kent, where I do not think that it existed in 1890.

1866. AGROSTIS TENUIS Sibth. *A. pumila* L. was cultivated at Shirley by Rev. W. R. Linton, and at once reverted to type; it is therefore omitted, as only a diseased condition.

1894. ARRHENATHERUM ELATIUS Mert. & Koch c. BIARISTATUM. The authority is Druce, Petermann's name having been published under *A. avenaceum* Beauv.

1905. CATABROSA AQUATICA Beauv. I cannot see any tangible difference between var. *littoralis* Parn. from W. Scotland and the Caithness plant which Prof. Hackel named as "forma *grandiflora*."

1914. POA ALPINA L. var. ACUTIFOLIA Druce. This appears to be the Lochnagar plant formerly called *P. stricta*. My sheet of it, collected with Mr. Hanbury in 1886, was sent in 1902 to Mr. Harry Fisher, an expert on the genus, who wrote as follows:—"I have not examined these; but Mr. Hanbury's from the same locality are *Poa laxa* Haenke var. *vivipara*, probably not found elsewhere. This plant has nothing to do with *P. stricta* Lindeb. This only grows in montane Scandinavia; all the so-called *stricta* in the Arctic Floras are *colpodea* Fr., which is nearer *cenisia* All. var. *arctica* (Br.)." In 1889 Prof. Babington endorsed it as being the *P. laxa* Haenke of his *Manual*, ed. 8. Mr. Druce probably follows Prof. Hackel in referring it to *P. alpina*. Mr. Hanbury grew it for some time in his garden at Clapton, and it remained viviparous. The other Lochnagar plant was named *P. laxa* by Mr. Fisher. Prof. Babington wrote: "I believe that this is my *minor*. These plants are very difficult, and their proper names especially so."

1916. P. CENISIA All. b. FLEXUOSA (Wahl.). This was included on the faith of Mr. Druce's record. When he kindly sent me a copy of his *List*, I was surprised to find no mention of it there. It appears that he could not find it again on a later visit to Ben Lawers, and that Prof. Hackel doubted the correctness of his own original determination. The specimen was sent to Mr. Fisher, who inclined to think it a form of *P. arctica* Br. (*P. cenisia depauperata* Fr. *Herb. Norm.* iii. 95), which Nyman treats as a subspecies of *P. cenisia*. As the *Catalogue*-numbers were already in type it seemed best to include it with a query. I have myself seen some very curious forms of *Poa* on Ben Lawers.

1927. GLYCERIA DECLINATA Bréb. Rev. W. R. Linton lately studied this near Shirley, Derbyshire, where it is frequent, and entirely agreed with my opinion that it is a good species. It prefers pond-sides, shallow splashes, &c., which are flooded in winter, and more or less dried up in summer; the same sort of station, in fact, which commonly produces *Carex Oederi*, Retz. In estimating the census-number I only reckoned vice-counties within my own knowledge of its occurrence, so the figure given is certainly too low.

1930. GLYCERIA FOUCAUDII Hackel *in litt.* (ATROPIS FOUCAUDII Hackel, 1896). This way of writing represents the fact; an alternative citation is "*A. Foucaudii* Hack. ex E. S. Marshall in *Journ. Bot.* 1907, p. 210" (which see).

1933. G. BORRERI Bab. b. HUMILIS mihi. Mr. Druce includes this, and I think that it deserves to rank, but have not tested it by cultivation. Prof. Hackel originally named it for me as *G. Borreri* Bab., var.; but specimens supposed to be the same thing, gathered next year near the original station, and sent by Major Wolley-Dod

to the Bot. Exch. Club, were then referred by him to the type. That is why it does not stand in the *Catalogue*.

1934. G. RUPESTRIS E. S. M. (SCLEROCHLOA RUPESTRIS Rendle & Britten). I cannot think this well placed under *Festuca*, and the new rule about retaining the earliest trivial compels me to adopt a fresh name.

1943. F. RUBRA L. b. GRANDIFLORA Hackel. Mr. Druce has a var. *megastachya* Gaud., which (if identical) takes precedence.

1953. BROMUS MAXIMUS Desf. is replaced in Mr. Druce's *List* by *B. rigens* L.

1955. B. SECALINUS L. and its vars. ought to have been starred, as it is not a native.

1958. B. HORDEACEUS L. c. LLOYDIANUS. Probably this should be called var. *molliformis* (Lloyd). I have in my herbarium some allied forms, *e.g.* var. *confertus* Mabille (under *B. mollis*), named by Hackel, but did not venture to include them, as I had no means of estimating their true value.

1967. AGROPYRON DONIANUM F. B. White. Nyman gives the range of *Triticum biflorum* Brign. as "Friul. Tyrol. occ. Vales. Pavia. Sicil. Gramen rarius." Its occurrence in Scotland, which has a predominantly Scandinavian type of vegetation, is very improbable. I observe that Mr. Druce likewise retains Dr. Buchanan White's name.

1969. A. PUNGENS R. & S. Insert d. *aristatum* Hackel. A pretty grass with remarkably long awns from Shoreham, W. Sussex, was determined for me by Prof. Hackel in 1888 as "*A. pungens* var. *aristatum* J. L. Warren (*Journ. Bot.* 1874, p. 357)." I do not possess that volume; but the name was probably published under *Triticum*, then in general use.

1970. A. JUNCEUM Beauv. Add b. *megastachyum*. This was published by Fries under *Triticum*, and specimens have been issued as var. *megastachyum* Fr. by Mr. Druce. In his *List* he calls it var. *macrostachyum* (Fr.) Druce; but in *Summa Veg. Scand.* var. *macrostachyum* is assigned to *T. laxum* Fr., which Hackel identifies with *A. gimceum* × *repens* (*A. acutum* auct. angl., non R. & S.).

1991. ASPLENIUM RUTA-MURARIA L. b. ELATUM. Mr. Druce quotes this as of Lange.

2026. BOTRYCHIUM LANCEOLATUM Angström. On the evidence adduced by Mr. Whitwell this deserves inclusion. Dr. St. Brody's accuracy used to be doubted; but Mr. J. W. White has now removed this impression.

2031. EQUISETUM PALUSTRE L. b. POLYSTACHIUM. Mr. Druce's authority for this is Villars.

2048. CHARA FRAGILIS Desv. e. VERRUCOSA (Itzigs.). This is a synonym of var. *delicatula* Braun.

Notes on the Foregoing.

By James Britten, F.L.S.

Mr. Marshall's interesting notes suggest many matters for discussion, on a few of which I offer the following notes. To each note is prefixed the *L. C.* number given by Mr. Marshall in his paper.

41. Caltha palustris L. c. minor. It is very probable that the plant so called by Syme is identical with the var. *β minor* of De Candolle, but their identity is not quite beyond doubt. De Candolle first published it (as "*β? Minor*") in *Syst. Nat.* i. 309 (1818), quoting as a synonym "*C. minor* Mill.! *Dict.* n. 2." His diagnostic character—"caule subunifloro, ascendente"—is not inconsistent with Syme's "stem decumbent or procumbent, usually bearing only one flower"; but Miller does not mention this uniflorous character—his diagnosis is "foliis orbiculato-cordatis, flore minore," that of *C. major*—his other constituent of *C. palustris* L.—being "foliis orbiculatis crenatis, flore majore." Miller says "These two sorts are supposed to be the same, but I have never observed either of them to vary, either in their natural places of growth, or when they are removed into a garden. They both grow upon moist boggy land, in many parts of England, but the first [*C. major*] is the most common." De Candolle's reference to the growth of *C. minor* in England seems based on Miller, whose cultivation of the plant he mentions; neither indicate the habitat as different from that of *C. palustris*, although the plant we now call *minor* is practically confined to "mountains," as Syme says. Those who think it desirable that a certain name should prevail over an uncertain one will probably continue to cite Syme as the authority. Syme, by the way, should stand in *Lond. Cat.* as the authority for the variety *Guerangerii*.

206. Silene quinquevulnera L. Mr. Melvill's note on this plant, as found "in profusion" at St. Helier's, Jersey (*Journ. Bot.* 1880, 146), seems conclusive as to its relation as a form to *S. anglica* L. [*gallica* L.]. Mr. Williams (*Journ. Linn. Soc.* xxxii. 57) so regards it, as do MM. Rouy and Foucaud (*Fl. France*, iii. 119) and all our British floras.

326–7. Dr. Robinson's conclusions were the result of much careful work and investigation, as will be seen on reference to his paper (*Journ. Bot.* 1906, 386–390), and cannot, I think, be lightly set aside. A reference to *Journ. Bot.* 1900, 31, will show that *O. stricta* L.—the *corniculata* of Mr. Marshall's list—has been at least naturalized in Devonshire for more than a century.

347. The authority for *Ononis spinosa* var. *mitis* is Linnæus (*Sp. Pl.* ed. 2, 1006), as correctly cited by Messrs. Groves in their edition of Babington—at any rate this is the plant which Miller (*Gard. Dict.* ed. 8 (1768)) intended by his *O. mitis*, for he cites the same synonymy.

434. As to this, see Journ. Bot. 1904, 308, where "Eich." should read "Cech."

677. "LACHII" is in accordance with the Vienna Rules, which recommend that specific names begin with a small letter, except those which are taken from names of persons or are old generic names. Lord de Tabley's published account of the name differs from that given by Mr. Marshall: he first noticed the plant in Tabley Moat, and adds, "I observed the same plant in the Lach Eye Meadows, near Chester. Should, therefore, Dr. B[oswell] think the plant worth a provisional name, I should propose *Callitriche Lachii*" (*Bot. Exch. Club Report*, 1875, 18).

722. CARUM PETROSELINUM Benth. & Hook. f. ("Benth. & Hook." in Mr. Druce's *List*). This name is rightly attributed to Benth. & Hook. f., who publish the combination in *Gen. Pl.* i. 890, but *C. segetum*, which is similarly attributed in *Lond. Cat.*, must stand as of Bentham (*Handb. Brit. Fl.* ed. 4, 193 (1878)), unless an earlier reference to the combination be forthcoming: Bentham and Hooker fil. did not make the combination. The unfortunate practice, initiated in the Kew floras and followed in the *Index Kewensis*, of attributing to the authors of the *Genera Plantarum* combinations which they never made is responsible for this and many similar attributions. Dr. B. L. Robinson has already protested against this practice in *Proc. Amer. Acad.* xli. 277 (1905), and his protest may be cited. Under "*Kanimia nitida* Bak. in *Mart. Fl. Bras.* vi. pt. 2, 370 (1876)" he writes: "In the *Index Kewensis*, ii. 3 (1895), Hooker f. and Jackson * reduce this species to *K.* '*erythralina*,' crediting the latter name to Bentham and Hooker f. *Gen.* ii. 247 (1873). If the combination had been correctly made in the *Genera Plantarum* it would obviously antedate Baker's binomial and stand according to the rule of priority under the genus, but this is not technically the case. At the place indicated, Bentham and Hooker f. merely refer to *Kanimia* the plant which they call '*Mikania erythralina* DC.' The combination *Kanimia erythralina* is not made, and indeed there is no assurance that the authors of the *Genera Plantarum* regarded the transferred plant as a distinct species or that in naming it under *Kanimia* they would have adopted the combination *K. erythralina*. All that their statement conveys is the fact that the generic affinities of De Candolle's plant are with *Kanimia* rather than with *Mikania*. There is, however, an added reason why the transfer in the *Genera Plantarum* should not in this instance be regarded as equivalent to the creation of the new binomial *K. erythralina*, for De Candolle's specific name was *erithalina*, given from a fancied resemblance of the plant to *Erithalis*. *Kanimia nitida* Baker is not only the first correct combination accompanied by accurate synonymy, but happily it is also in accordance with

* As has been pointed out more than once, the compilation of the *Index Kewensis* was the work of Mr. Jackson, although the volumes were erroneously lettered on the back by the Clarendon Press as "Hooker & Jackson."

the most rigid priority of the specific name, for it is founded on *Eupatorium nitidum* DC. *Prod.* v. 180 (1836), which has priority of position over *Mikania erithalina* DC."

836. GNAPHALIUM ULIGINOSUM L. b. PILULARE. It seems to me difficult to resist the conclusion arrived at by Mr. Fryer in his careful paper in *Journ. Bot.* 1889, 83.

895. ARCTIUM NEWBOULDII is correctly cited as of Arthur Bennett, though the name does not appear in the Supplements to the *Index Kewensis* : see *Journ. Bot.* 1899, 342; *Irish Nat.* 1903, 289. From the latter may be quoted Mr. Bennett's diagnosis of our four species :—

"*A. majus* is well distinguished.

"*A. minus* has the *small* heads and exsertal flowers.

"*A. intermedium* has the heads in size between *majus* and *minus* (but very variable), and *stalked*—stalks often very long.

"*A. Newbouldii* has the heads agglomerated (and almost sessile) at the apex of the *principal stems*, at times the side branches show more or less stalked heads."

1195. If Mr. Marshall's suspicion be verified, the name *Mittenii* must be taken for the plant, as that was published in *Journ. Bot.* 1870, 244, while Corbière's book was not published until 1893.

1207. In the three recently published lists, a capital initial is employed for such specific names as *trifolii* and *picridis*. This however seems hardly in accordance with Recommendation X. of the Vienna Rules, which limits the capital to "names taken from names of persons or those which are old generic names."

1241. Before taking up the name *V. didyma* we went into the matter very carefully, and we find nothing in Mr. Marshall's note to show that Tenore's name is not tenable for the species.

1258. "Boiss." is quite correct, as Boissier (*Fl. Orient.* iv. 437) subsequently reduced to a variety what he at first considered a species. Mr. Druce writes "c. *montioides* (Boiss.) Hiern," but Mr. Hiern (*Journ. Bot.* 1898, 321) rightly cites Boissier, *l. c.*

1360. Mr. Marshall does not seem to have noticed that Fries's *Novitiæ* was not "published simultaneously," but at considerable intervals; and that, as has already been pointed out (*Journ. Bot.* 1907, 103), *Lamium mollucellifolium* dates from 1819 and the proposed alteration to *intermedium* from 1823. The case is not one of "nomenclature by dogma" but of priority.

1598. ASPARAGUS MARITIMUS Mill. Mr. Marshall's reference to Lloyd seems to be to his third edition (1876, p. 314) where he says: "Cette forme est loin d'être constante; je l'ai souvent recontrée à tige demi-couchée dressée et haute de 3–10 déc." Lloyd's later observations, however, led to an opposite conclusion; in ed. 4 (1886, 350) he writes: "Cultivée et semée loin de la mer cette plante conserve ses caractères, la tige se couchant raide dès sa sortie de la terre."

GLASS MODELS OF FLOWERS.

By Mary W. Porter.

A visitor from this side of the Atlantic to the Harvard Museum of Comparative Zoology is particularly struck by the beauty and uniqueness of one of its collections. The Ware Collection of Glass Flowers is the only one of its kind in existence, and the models composing it are so exquisitely life-like in form, colour, and texture that it is difficult to realize that they are not the work of nature, but the handiwork of two men, Leopold and Rudolph Blascka, of Germany. The elder, Leopold, died some years ago, and the completion of the Harvard collection is now being carried on solely by his son Rudolph without assistant or apprentice. He alone possesses the skill and knowledge requisite for the production of the models.

Leopold Blascka was the founder of the art of representing in glass marine invertebrates and plant life, and collections of the former from his studio are to be seen in many important Museums of Natural History both in Europe and America. He was a careful student of zoology and botany, as is also his son. In 1862 Leopold made a small collection of the rarer *Orchidaceæ* in glass for the Prince Camille de Rohan, of Prague, which was unfortunately destroyed by fire, and this gave him a dislike to that branch of his art. It was not until 1886 that he again attempted flower modelling, and then only after much persuasion on the part of Dr. George Goodale, of Harvard, who paid a visit to the studio at Hosterwitz, near Dresden, with the express intention of obtaining a promise for a certain number of models for the Harvard Museum. Dr. Goodale had been struck by the unsatisfactory methods of representing flowers for botanical study, and one day, while studying the Blascka collection of marine invertebrates, the idea of representing flowers in glass came to him. He promptly went to Hosterwitz, and eventually contracts were made by which the entire time of both Blasckas was obtained by the Museum, and the collection became the gift of Mrs. and Miss Ware, of Boston, in memory of Mr. Charles E. Ware.

The original plan was to represent the flora of North and South America, and the younger Blascka twice crossed the ocean in order to study American plants, but this plan became extended. When the collection is complete, in about a year, it will include models of all the great types of the flora of the world. At the present time 687 species of flowering plants, 520 genera, 147 natural orders are represented; the morphology is illustrated by more than 2500 details. The flowers are in sprays and clusters, of such accuracy in every detail and so natural in appearance that the living flowers seem to lie before one. The classification is arranged in the sequence adopted by Engler in his *Pflanzenfamilien*. Walter Deane, who carefully examined a number of models in the order to discover any possible errors, testifies to the artist's botanical knowledge. He says:—"In the case of *Aralia spinosa* L., the building up of the

complex inflorescence with its multitudinous minute flowers is almost past belief. On this cluster, with its flowers so small that their structure can be seen only with a lens, while many of its buds are so minute as to be indistinguishable to the naked eye, I counted, of buds, blossoms, and developing fruit, from 2500 to 3000. And yet every flower has its five petals, and five alternating stamens with long filaments." On examining the under part of the cluster he found equal perfection, and that "every plant tells the same story of nature closely followed out." The process by which the modes are produced is said to be not that of ordinary glass-blowing, but quite simple conditions, and with the least complicated instruments; the work is accomplished with great rapidity; the nervous strain and tension on the part of the worker is great. Each model consists of some sort of glass, the stems only being supported in some cases by fine wire. The colour of the glass has sometimes been intensified or modified by the use of mineral pigments, which are stated to be unaffected by light. Blascka, who claims that his ancestors brought the art of glass-making from Venice to Bohemia, is in possession of various secrets long in the family in regard to the preparation of the glass, colour, and cement.

NEW CHINESE PLANTS.

By S. T. Dunn, B.A., F.L.S.

Tutcheria

(*Ternstræmiacearum* genus novum).

Sepala et petala imbricata; stamina indefinita, cum petalis plus minus basi coalita; ovarium 3–6-loculare, loculis 2–5-ovulatis, ovulis anatropis, lateraliter affixis. Capsula loculicide regulariter dehiscens, valvis 3–6, lignosis, deciduis, columna centrali clavata, robusta, persistente. Semina in loculis 2–5, varie angulata, exalata; albumen 0, testa ossea; embryo rectus, radicula inferiore; cotyledones longitudinaliter plicatæ.—Arbor foliis coriaceis, sempervirentibus. Flores axillares, speciosi.

Tutcheria spectabilis, sp. unica. Arbor mediocris. Folia alterna, ovato-lanceolata, 5–6 poll. longa, 2–2½ poll. lata, obscure crenata, coriacea, glabra, supra nitentia, acuminata, basi cuneata, breviter petiolata. Flores in novellis solitarii, axillares, leviter suaveolentes, pedunculis brevissimis; sepala in seriebus 2–3 imbricata, subrotunda, ½–1½ pol. diam., coriacea, dense sericea, pallide viridia, retusa, in petala gradentia; petala 5, late obovata, 1½–2 pol. longa, coriacea, in parte centrali externe sericea, alba, retusa; stamina indefinita, 5–8-serialia, cum petalis basi in pulvinum annularem consolidata, petalis bis breviora, aurantia, filamentis staminum in seriebus 2–3 interioribus in parte inferiori incrassatis. Ovarium 4–6-loculare, styli fere ad apicem coaliti, 4–6, stigmatibus truncatis. Capsula spheroidea, 2–3 pol. diam. sericea, rugosa, brunnea; semina castanea, nitida, compresso-

ovata, faciebus internis varie angulatis et corrugatis, faciebus externis teretibus, angulis internis hilo opaco notatis, externis acutis curvatis. Radicula breviter exserta.

Camellia spectabilis Champ. in Trans. Linn. Soc. xxi. 111 (1850); Hook. Kew Journ. iii. 310 (1851); Seem. Bot. Herald, 367, t. 78 (1852–7); *C. reticulata* Benth. Fl. Hongkong. 30 (1861); Hemsl. Ind. Fl. Sin. i. 82 (1886), *vix* Lindl.

China: Hongkong, Happy Valley, 1873, *Ford*; Wongneichung, 1894 (fruit), *Tutcher*; Hongkong Botanic Gardens, 1908.

In his *Annual Report of the Botanical and Forestry Department for the year 1883*, § 39, Mr. Ford mentioned "*Camellia reticulata* Lindl." (by which he would intend the Hongkong plant) as seen by him on the Lo Fou Shan, but no specimen was preserved.

What is possibly a second species of the genus occurs in Western Fokien (Hongkong Herb. no. 2459), Lo Fou Shan (no. 610), and Hongkong Island (no. 2058); it has the persistent column and three regular valves in its capsule, while its seeds are numerous in each loculus and are laterally attached. No flowers or perfect seeds have been seen.

A third possible species is *Pyrenaria Jonquieriana* Pierre. Its three 3-ovulate ovarian cells distinguish it from *Pyrenaria*. Pierre's figure of the fruit (Pierre, Fl. For. Cochinch. t. 120) closely resembles that of *Tutcheria spectabilis* in the nearly mature state.

The systematic position of *Tutcheria* is clearly next to *Pyrenaria*, which it resembles in its flowers and seeds. It is distinguished by the dehiscence of its capsule and by its multiovulate loculi.

Bauhinia Blakeana, sp. nov. Arbor parva. Folia rotundata, 4–5 pol. diam. coriacea, subtus parce puberula, pallida, apice profunde retusa, mucronulata, basi cordata, venis sæpe 13, flabellatis, petiolis tertiæ parti laminarum æqualibus. Racemi nonnunquam paullo ramosi, 1–3, terminales, 4–7 pol. longi. Flores speciosi; pedunculo ad ½ pol. longo, medio vel prope basin articulato, bibracteolato; calyx concavus, circiter 1 pol. longus, pubescens, rubidus lineis viridibus notatus, ad anthesin latere inferiore ad basin fisso, plus minus reflexus, apice breviter bifidus laciniis altero 3, altero 2 dentes gerentibus; petala 5, omnes lanceolata unguiculata, 2–3 poll. longa, rosea vel rubro-purpurea, petalo superiore basi intensius colorato, staminibus tertio parte longiora; stamina perfecta 5, tribus antheros majores gerentibus; staminodia 2–5; pistillum staminibus æquale. Fructus ignotus.

Hongkong Botanic Gardens, Hongkong Herb. no. 1722.

The trivial name of this species commemorates the kindly interest taken in the Hongkong Botanic Gardens by Sir Henry and Lady Blake during the Governorship of the former, which ended in 1903. The tree is at present a very rare one in cultivation and is likely for some time to remain so, as it can only be propagated by cuttings. This is the more to be regretted because out of the numerous cultivated species of this charming family there is probably none that equals it either in the beauty or the

profusion of its flowers. For more than four months the trees remain covered with their large reddish-purple blooms which develop successively on the long racemes.

The only trees known to exist at the present time are those in the Hongkong Botanic Gardens, a few near the Sanatorium of the Missions Etrangères at Pokfulam, on the other side of the island, and a few more at the Roman Catholic Cathedral at Canton. It is indeed to the Fathers of the above Mission that we owe the preservation of this *Bauhinia*. It was discovered by them near the ruins of a house on the sea-shore, and cuttings were planted in their garden; from the trees thus produced the Botanic Gardens were supplied. Specimens have been compared in the Kew and other herbaria, but without the discovery of any similar plant from elsewhere. Its native country must remain for the present obscure.

Pachysandra stylosa, sp. nov. Frutex vagans. Folia alterna, ovata, integra, 5-6 pol. longa, chartacea, glabra, apice obtuse acuminata, basi rotundata, venis paucis utrinque prominentibus, petiolis 2–3 pol. longis. Spicæ vel (floribus infimis breviter pedunculatis) racemi solitarii axillares, nutantes, 1–2 pol. longi, rubri. Flores plurimi superiores masculi, sessiles, contigui, 2 lin. longi; bracteæ ovatæ, concavæ, margine ciliolatæ; sepala bracteis similia. Flores fœminei 3–6, apud basin spicæ breviter stipitati, subcontigui, bracteis 4–6, lanceolatis, margine ciliolatis stipati; styli 3, sepala 3-plo excedentes, 4–5 lin. longi, recurvi.

Deep gorge at Tze Chuk Hang, Central Fokien, *Dunn*, May 30th, 1905, Hongkong Herb. no. 3514.

This species might be mistaken for a robust state of *P. axillaris* Franch., but is distinct in its entire leaves, elongate inflorescence, and stalked female flowers.

BRISTOL PLANTS.

By Cedric Bucknall, Mus. Bac., and James W. White, F.L.S.

Some good results in the detection of rare plants have attended a resumption of work on the long-delayed *Flora of Gloucestershire*. Closely attending Miss Roper's discovery of *Carex vesicaria* (p. 231), come the following new records for that county, with one for Somersetshire.

Ranunculus Lingua L. In very wet—sometimes flooded—spots on enclosed land in the Boyd Valley, West Gloucester, about six miles south-east of Bristol, and but a short distance from the Somerset boundary. The plant is in considerable quantity and very luxuriant, reaching a height of five feet among osiers and rank aquatic vegetation. Unknown in the county until a few weeks ago, when specimens were brought to a meeting of University College Botanical Club by Miss Brooks, the discoverer.

Corydalis claviculata DC. A small patch of, say, three square yards on a sandstone outcrop of the coal-measures not far from the village of Iron Acton, West Gloucester. This, which in the Bristol district appears to be a decreasing or dying out species, has not been hitherto recorded for the county.

Galium erectum Huds. Grows plentifully on a dry grassy slope in the locality last mentioned. Only one other station in West Gloucester is known to us. Babington put the flowering period of this species a month earlier than that of *G. Mollugo*, and he was quite right. The Iron Acton plant was in full fruit before the other began to flower. *G. erectum* does not often exceed two feet. The longer stems have one or more spreading erect branches in the lower half. Leaves linear-oblong or lanceolate, erect-spreading as well as the panicle-branches and pedicels, the latter generally divaricate in fruit. Corolla larger than in *Mollugo*, with less distinct apiculi. Plant of a paler green.

Carex divisa Huds. Is not mentioned in Top. Bot. for v.-c. 33 or 34. An increasing patch of it has for some years been under observation in St. Philip's Marsh, Bristol, West Gloucester, not far from the tidal Avon. The sedge, however, now grows on made soil, as the marsh-land level has been raised of late years by tipping in city refuse. Its foliage and stems are well developed, but the spikes are unusually small, owing possibly to poor nourishment afforded by the dry ashes into which the plant's roots have now spread. *Lepidium latifolium* flourishes close by, under the same conditions; and it is not long since *Polypogon littoralis* (now buried) grew along the edges of clay-pits in the marsh. That these interesting species are all of alien introduction is unlikely; we are inclined to look on them as survivors from the ancient salt-marsh vegetation of the place. Unfortunately all must shortly disappear, from the extension of works and factories over the ground.

C. elata All. (*stricta* Good.). The only evidence tending to connect this much misunderstood species with our district or with the county of Somerset has rested on some unconfirmed reports of its occurrence near Bath, which the author of the *Flora of Somerset* declined to accept. A few weeks ago we noticed a new sedge, densely tufted, upon the edge of some water-holes in a marsh between Wraxall and Tickenham, North Somerset, and are convinced that it is correctly determined as above. Mr. A. Bennett agrees, remarking that the specimens are less filamentose than usual. On going carefully into that matter we find that the character, in our gathering, is not so well marked on the flowering-stems as upon the barren shoots. And it is the delicate margin of the upper part of the sheaths that becomes filamentose, as stated by Hooker in the *Student's Flora*—a better definition than that given by Babington. By the Floras of Gremli and of Gillet et Magne our plant runs down straight to *C. elata*.

THE *VILLOSÆ* SECTION OF THE GENUS *ROSA*.

By the Rev. Augustin Ley.

The Editor will allow me space to thank Mr. Barclay for his criticisms on the treatment of this section, for which I am responsible, in *London Catalogue* ed. 10. It is only by co-operation of many such candid critics as himself that accuracy can be attained in such groups. But I must enter a few counter pleas. I will take the plants in order as mentioned by Mr. Barclay, only premising that his criticism is throughout directed rather to my paper on the subject in this Journal for 1907 (pp. 200–210) than to the *London Catalogue*.

Rosa pomifera J. Herrm. Since writing my paper I have seen this rose again—in Brecon, in Hereford, and in the Craven district of Yorks; also from South Aberdeen (Ballater, *Herb. Druce*!). Bearing in mind my own and Mr. Marshall's caution respecting the difference between the cultivated and wild plant, I think this rose will be found widely spread in mountain districts.

R. mollis Sm. var. *recondita* Puget. I am unable to separate the very large-fruited *mollis*-like rose with abundant subfoliar glands common in North Britain from the Continental *R. recondita*. Its position is of course a matter of critical judgement, and Continental botanists ought to know their own rose; but I submit that in view of the *red* fruit and *eciliate* petals, its subordination to *R. mollis* is not unreasonable. Does Mr. Barclay put these glandular forms under type *mollis*?

R. omissa Déséglise. For the first record of the var. *resinosoides* Crép. as a British plant see Ann. Scot. Nat. Hist. 1883, p. 250. The name was suggested by Crépin himself, and I have seen the specimens submitted to Crépin, with his determination (Herb. Druce). Roses quite similar to this do occur abundantly throughout Britain, and others bearing all the characters of type *omissa* are scattered, chiefly in the north. With regard to the position of *R. pseudorubiginosa* Lej., I gladly accept Mr. Barclay's criticism: I have never, as he of course has, had the advantage of watching the fruit ripening, and my herbarium specimens do not suggest that the sepals are fully persistent.

R. submollis Ley. My expression "very near *R. mollis*" has given a wrong impression. This is corrected by the position assigned to this rose in the *London Catalogue*. It is certainly very near *resinosoides* Crép., and is best placed next to this.

R. suberecta Ley. Further experience has only confirmed my conviction that this rose is a "good species," and not a "botanical dust-bin" for unassignable forms. I must have expressed myself badly to lead Mr. Barclay to suppose that I imagined every rose of the subsection stained with vinous red to fall under this species; still, I have over and over again found the colour mentioned by Woods a true *indication* of the plant. Mr. Barclay's remarks on the colour of the flowers in Scottish *tomentosa* forms are very interesting. I am glad to learn that the var. *glabrata* is not

identical with Fries's *R. mollis* var. *glabrata*, and I suppose the Scottish plant must now be called without hesitation var. *glabrata* Ley. It will be seen that I was unable to come to a conclusion on this point, and indicated my hesitation in my paper by a "?."

R. Andrzejowscii Stev. Besser's type-specimens, could they be inspected, should clear up some of the uncertainties which beset this rose. My description of the leaves follows Déséglise, but I have no literature at hand by which to follow out the subject. Some of the British plants assigned to this are remarkable plants, bearing large subfalcate thorns and very aciculate petioles. If not Steven's plant, they must bear a new name.

R. cinerascens Dumort. Here Mr. Barclay has found a real error in my paper, of which I can give no account. The sepals are clearly as he says, but the thorns seem to be subfalcate, as in *R. Andrzejowscii*. We owe him a debt for this correction, which will make the true position of this plant lie next to *R. omissa* Déséglise.

R. obovata Ley. I was of course aware that Crépin assigned this form to the group *Coriifolia*. But Mr. Baker still (in 1907) assigns it to the *Villosa* group, and my judgement concurs. Will not some botanist who has access to the living plant kindly make the *test of the nose*, and tell us the result? It should be final.

LEATHESIA CRISPA Harv.

By A. D. Cotton, F.L.S.

During the past June a number of specimens of an alga, which proves to be the little-known *Leathesia crispa* Harv., were collected on the Dorset coast near Swanage.

When first examined it was at once evident that the plant represented a species described and figured by Kuckuck as *Leathesia concinna*, a name which has become familiar by the reproduction of Kuckuck's figures in Oltmann's *Morphologie und Biologie der Algen* (Bd. 1, figs. 233–4). *L. concinna* Kuck. was only known from two localities, and had not been recorded for Britain.

In De Toni's *Sylloge Algarum* reference is made to *L. crispa* Harv., but neither diagnosis nor original reference is given. De Toni merely quotes a paper by J. Agardh in which the name occurs, and states that the plant is "plane ignota." Batters, in his Catalogue, lists this species, recording it from Cumbrae and Alderney.

The description of *L. crispa* is to be found in a paper in the *Natural History Review* for 1857 (p. 201, t. 12 A). From the account and figures there given there could be little doubt that *L. concinna* Kuck. and *L. crispa* Harv. represented the same species. With the exception of Chalon, no previous observer appears to have noted this; Chalon, however, in his recently

published List,* records *L. crispa* from Gatteville, and quotes *L. concinna* as a synonym. No remark is added. In order to definitely settle the question, a comparison has been made of authentic material of both plants. Material of *L. concinna* was kindly supplied by Dr. Kuckuck; and for opportunity to examine the original gathering of *L. crispa*, now in the herbarium of Trinity College, Dublin, the writer is indebted to Dr. E. Perceval Wright. The two plants agree exactly, and there remains no doubt that *L. concinna* Kuck. is a synonym of *L. crispa* Harv. Dr. Kuckuck also wrote saying he had become aware of this fact.

The appearance of *L. crispa* when growing is very distinct. In colour it is deep brown, and is apparently invariably epiphytic on the narrow forms of *Chondrus crispus*. The individual plants are subglobose (·5–1 cm. in diam.), but are frequently confluent, and appear as elongated masses on the strap-shaped fronds of the host. To the touch, it is extremely gelatinous. In microscopic characters, it is distinguished by the long curved assimilating filaments, which Harvey described as being unequally constricted at the nodes, *i. e.*, crenate along the outer edge and even along the inner, and not regularly moniliform, as in *L. umbellata* and other species.

The material collected by the writer was found for the most part at Durlston Head, where it was observed on *Chondrus* plants that were just exposed at low water. Small immature specimens had been collected the day previously in a neighbouring locality, and special search was made for further material. At Durlston many mature specimens were observed, and the plant was sufficiently conspicuous to attract attention. It occurred intermixed with *L. difformis*, but, except in the youngest stages, it was distinguishable from that species by the darker colour and more solid frond.

The distribution of *L. crispa* is remarkable. Harvey's plants were gathered at Cumbrae; and in the herbarium of the late E. A. L. Batters, now at the British Museum, there are specimens from Alderney and Greystones, Co. Wicklow. Dr. Kuckuck states that he found the plant at Tatihou (St. Vaast-la-Hougue), and that it is frequent in Heligoland. There is also the Gatteville record mentioned above. These six localities, together with the new Swanage record, constitute the extent of its known distribution. At Durlston Head a considerable number of plants were observed, and if the species were at all general or regular in its occurrence, it would be impossible for it to have been previously overlooked. This conclusion is strengthened when one calls to mind the zealous band of algologists who diligently explored the south coast during the early and middle decades of the last century.

The presence of *Leathesia crispa* at the approach of a port such as Glasgow suggests the possibility of its having been in-

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* *Liste des Algues Marines observées jusqu'à ce jour entre l'embouchure de l'Escaut et la Corogne* (Antwerp, 1905), 86.

troduced; but being known from that locality since 1857, such introduction cannot be regarded as recent. Judging from its distribution, it appears more probable that the alga is a native of the British coasts, and that it is always a rare species. It may also be somewhat sporadic.

As neither Harvey's nor Kuckuck's paper is readily accessible, a full description of *L. crispa* is added:—

Leathesia crispa Harv. "Short Descriptions of some New British Algæ," in Nat. Hist. Review, vol. iv. 1857, p. 201, pl. 12 A. *L. concinna* Kuck. Bemerk. z. mar. Algenveg. v. Helgoland, ii. in Wiss. Meeresunters. Abt. Helgoland, Neue Folge, Band ii, Heft i, pp. 387–389, fig. 12.

Plants subglobose or irregularly tubercular, small ·5–1 cm. diam., dark brown, solid or becoming slightly hollow. Thallus composed of densely-packed branched filaments radiating from a basal cellular disk; lower cells of filaments very elongated, upper cells short, more or less isodiametric, and giving rise to assimilating filaments, hairs, and sporangia. Assimilating filaments long, simple, curved, unilaterally moniliform, 10–17-celled; basal cells elongated, cylindrical, 5–7 μ wide, terminal cells short, subglobose, 7–10 μ wide. Chromatophores discoid, 2–4. Hairs numerous, colourless, 7–10 μ wide, with basal growth. Unilocular sporangia frequent, clavate-pyriform, terminal on medullary filaments, 40–60 × 15–20 μ. Plurilocular sporangia very rare, short, filamentous, uniseriate, terminal on medullary filaments or rarely lateral on assimilating filaments, 30–40 × 4–6 μ.

Hab. On *Chondrus crispus* Stackh.

Season. April–July.

Distribution. Scotland (Cumbrae), Ireland (Greystones), England (Swanage), Alderney, Normandy (Gatteville, Tatihou), Heligoland.

ARTHUR LISTER, F.R.S.

Arthur Lister was born at Upton House, West Ham, in 1830, and was the youngest son of Joseph Jackson Lister, F.R.S., distinguished for his discoveries in the optics of the microscope.

Some interesting details of Arthur Lister's early life have been kindly supplied by his daughter and constant fellow-worker, Miss Gulielma Lister, F.L.S., to whom the writer of this notice is indebted for much help.

"From his early childhood his greatest delight was in being out of doors and in observing Nature. The difficulty of learning to read was removed when his mother gave him reading lessons from White's *Selborne*, for that told of birds, and birds were almost a passion with him. He learnt to know them in the delightful home garden, and identified them from Bewick's wood-cuts. These illustrations he often copied in pen and ink, and before going to school at the age of eleven he had taught himself to engrave on wood, in order that he might reproduce his favourite

cuts. The weather changes had great attraction for him; when he was about ten he was given a thermometer, from which he made daily records of the extremes of temperature."

"His first school was at Hitchin. He always spoke of himself as a backward boy, but the headmaster, Mr. Isaac Brown, must have recognized his love of natural history. It was from him he received his first insight into the study of mosses on the long walks they took in the neighbourhood; and when he left Hitchin he was given the two volumes of the *English Flora* (Hooker and Berkeley) dealing with mosses and fungi."

The strong inborn taste for natural history which Arthur Lister thus showed so early was happily developed by circumstances as time went on. When he first began his business career, at the age of sixteen, his work was in the country (in Bedfordshire). He then became a keen lover of sport, a taste which remained with him all his life, though, like Charles Darwin, he tended in his later years to give up sport for science.

Subsequently, when in business at Bradford, he lived in farmhouse lodgings, and so was able to keep up his country pursuits. It was at Bradford that he acquired from the lessons of Mr. James Lobley that skill in drawing and painting which he possessed in so remarkable a degree, and which proved of such essential service to him in his work, as well as a delightful means of recreation.

In 1855 Mr. Lister married Miss Susanna Tindall, daughter of Mr. William Tindall, of East Dulwich; two years later he removed to Leytonstone, and became a partner in his father's business as a wine-merchant. Leytonstone continued to be his London home till the close of his life. In 1871 he, with two of his brothers, bought Highcliff at Lyme Regis, and this beautiful place grew to be more and more a second home to him, especially after he retired from business about 1888.

In very early days Mr. Lister had taken an interest in mosses and other plants, but (to quote once more from Miss G. Lister's notes) "it was not till 1866 that he took up the systematic study of field botany, which was such a joy to him all the rest of his life. A large family party was spending the summer holidays at Torquay, and my uncle Joseph [now Lord Lister] revived for their sakes the lessons he had received from Prof. Lindley during his studies at University College. Henceforth every holiday added new plants to my father's beloved collection. From flowering plants he went on to the study of mosses, fungi, and lichens, making drawings of their parts through the microscope with the *camera lucida*. Although specializing in botany, all forms of life were interesting to him, and his older notebooks show careful sketches of the creatures found in the forest ponds and the sea-pools. A collection of butterflies and moths was also made with his children."

His studies of the various groups he took up in succession were wonderfully thorough. When the present writer first visited him at Leytonstone in 1890 he found him following under the micro-

scope the process of karyokinesis in the living cells of the staminal hairs of *Tradescantia*, and, according to his invariable custom, making careful drawings of every stage. Shortly afterwards, on another visit, the conversation turned on the question of fertilization in lichens, as described by Stahl, on whose conclusions some doubt had at that time been cast by the school of Brefeld. It then turned out that Mr. Lister had fully investigated the subject for himself; he showed the writer a series of drawings of the reproductive processes in *Collema*, which went far to substantiate Stahl's views, since strongly confirmed by the work of Baur and Darbishire.

The fungi were a favourite group with Mr. Lister; it was from the study of microscopic fungi that he was attracted to the family of Myxomycetes or Mycetozoa, to which the chief work of his later life was devoted. On Feb. 15th, 1877, he showed the streaming plasmodia of *Badhamia* at the Linnean Society, and from that time onwards he continued to make the group his principal study, becoming recognized as the leading authority on these wonderful organisms.

Among his contributions to the physiology and cytology of the Mycetozoa may be mentioned his "Notes on the Plasmodium of *Badhamia utricularis* and *Brefeldia maxima*" (Ann. of Bot. vol. ii. 1888); "Notes on the Ingestion of Food-material by the Swarm-cells of Mycetozoa" (Journ. Linn. Soc. vol. xxv. 1889); "Notes on *Chondrioderma difforme* and other Mycetozoa" (germination of spores) (Ann. of Bot. vol. iv. 1890); "On the Division of Nuclei in the Mycetozoa" (Journ. Linn. Soc. vol. xxix. 1893); "On the Cultivation of Mycetozoa from Spores" (Journ. Bot. 1901). His systematic work on the family began in 1884, when Prof. I. Bayley Balfour, F.R.S., lent him, first his own collection made at Strasburg when working with De Bary, and subsequently Greville's collection from the Edinburgh University Herbarium. Later, through the kindness of the authorities of Kew and the British Museum, he was enabled to study the collections of those great Herbaria; besides which he visited Strasburg to examine Rostafinski's types, and made use of many other collections, as detailed in the introduction to his Monograph of the Mycetozoa. This great work, published by the British Museum in 1894, gives a complete account of the species known up to that date, and is illustrated by seventy-eight plates (besides numerous woodcuts) from drawings by Mr. Lister himself and his daughter Miss G. Lister. It is understood that a new edition was in preparation at the time of Mr. Lister's death, and that it will be completed by Miss Lister; the proposed use of coloured illustrations will add materially to the value of the work. Various systematic papers were published by Mr. Lister subsequently to the Monograph, notably one on the Mycetozoa of Japan, which appeared in this Journal in 1904; other papers, in which Miss Lister was associated with him, have also appeared in these pages—the last in this volume.

It was characteristic of Mr. Lister's work that in his investigations of the Mycetozoa he always studied the life-history and

physiology of the family side by side with the taxonomy. Cultures of living "creepies," as he used to call them, were constantly carried on both at Leytonstone and Lyme.

Mr. Lister's name will go down to posterity mainly as that of a great specialist. Those, however, who had the privilege of knowing him personally will think of him less in that light than as a many-sided naturalist, whose knowledge and love of living things embraced almost every group of organisms.

Mr. Lister was a member of the Society of Friends, a body which includes so many distinguished men of science. It was also typical of the Society to which he belonged that he was pre-eminently a good citizen, who, as a magistrate, a member of the School Board, a Poor-Law guardian, and in many other capacities rendered great services to the public life of his district. At his country home, though he did not take up any public office, he was interested in the town of Lyme and its institutions, and was a trustee and a generous supporter of the cottage hospital there.

Mr. Lister became a Fellow of the Linnean Society in 1873, and of the Royal Society in 1898. He was also an active member of the Essex and Dorset Field Clubs, and of the Mycological Society, of which he was president in 1906. He was much interested in education, and, as Miss G. Lister says: "From his own intense feeling of the ennobling power of the study of natural history, he took an active part in its introduction into the schools with which he came into touch, and with whose teachers he had the most friendly and sympathetic relations."

Mr. Lister's health had been failing for some little time, but almost to the last he was still able to enjoy some of his favourite walks in the charming neighbourhood of Lyme. His death took place somewhat suddenly on Sunday, July 19th, at Highcliff. His memory will always be dear to his many friends as that of a devoted lover and investigator of Nature, a delightful companion, and a most lovable man.

D. H. Scott.

SHORT NOTES.

Mimulus moschatus Dougl. (p. 300).—At the beginning of last August I saw a small patch of this *Mimulus* in flower in the bed of the River Taw. The locality is in the parish of South Tawton, but only a few yards above the Sticklepath Bridge, and so, I should suppose, not more than two miles to the east of Belstone, where, Mr. Hiern says, "it was found apparently wild, July 9th, 1887." I gathered no pieces, and so cannot say whether the plant is scentless in this South Tawton locality, as I found it to be in the neighbourhood of Rydal in July, 1906 (see Journ. Bot. 1907, p. 11). —W. Moyle Rogers.

Isle of Man Plants.—In the *List of Flowering Plants: Isle of Man* (1900), compiled by the Rev. S. A. P. Kermode, there is no mention of either *Filago minima* or *Trifolium scabrum* as having

been found on the island. I have not been able to ascertain whether or no they have since been recorded for the area. It may be as well therefore to put on record that both these plants were found by me on the Murragh of Ramsey, when staying there for a few days in July of this year. Although I found both plants to occur in considerable quantity, and sometimes in association, their presence might easily have been overlooked by me, as apparently they have been by others before, but for the fact that I was engaged in a close scrutiny of the ground in the hope of finding *Trifolium glomeratum*, which from the nature of the site I had thought likely to occur. Diligent search, however, failed to discover this plant. Neither of the two first-named species were observed to attain here a robust development, the ground they occupy being of an arid, stony nature. I again came upon *Filago minima* a few days later at a point, probably four miles distant, on the roadside between Ballaugh and the Curraghs, where it grew with much greater luxuriance, though as far as I could ascertain over a very limited area. Here it was associated with the larger-growing *F. germanica*.—W. B. Bruce.

Welsh Records.—This August I spent a few days in Wales, when the following plants, the majority of which are not given in *Topographical Botany*, or in Mr. Arthur Bennett's *Supplement* thereto, for the counties of Brecon (42), Monmouth (35), and Radnor (43), were observed. An asterisk denotes a new county record, a dagger an introduced species:—**Papaver dubium* L. Near the Severn Tunnel (35).—†*Chelidonium majus* L. Abergavenny (35).—†*Coronopus didymus*. Abergavenny (35); Crickhowell, Hay, &c. (42).—†*Alyssum maritimum* Lam. var. *viride* Tausch. Hay (42).—*Sagina ciliata* Fries. Crickhowell (42); *Abergavenny (35).—**Arenaria leptoclados* Guss. Hay, Crickhowell (42); Abergavenny (35); Boughrood (43).—†*Saponaria officinalis* L. By the river at Boughrood (43); at Crickhowell (42), in great plenty.—*Malva moschata* L. *var. *heterophylla* Lej. & Court. Boughrood (43); near the Three Cocks Junction (42).—†*Impatiens glandulifera* Royle. Naturalized by the Usk at Crickhowell (42).—*Rubus Borreri* Bell-Salt, and *R. Leyanus* Rogers, at Tintern (35).—†*Ribes Grossularia* L. Three Cocks (42).—†*Sedum reflexum* L. Crickhowell (42).—**Sison Amomum* L. Hedge near the Three Cocks Junction (42).—**Silaus flavescens* Bernh. Near Hay (42).—*Epilobium roseum* Schreber. About Tintern (35).—†*Matricaria suaveolens* Buch. Abergavenny (35); Crickhowell, Hay. In the former place on the road to the Cille Crags. Rapidly extending its range.—**Eupatorium cannabinum* L. Boughrood (43).—†*Hieracium aurantiacum* L. Near Vrowchurch by the railway, but some distance from habitations (35).—**Campanula Trachelium* L. Between Abergavenny and Crickhowell, I think over the Brecon border (42).—*Melampyrum pratense* L. *var. *hians* Druce. By the Wye at Boughrood (43).—**Euphrasia nemorosa* Pers. Tintern (35).—*Linaria minor* Desf. Boughrood, by the railway, luxuriant specimens (43).—**Verbena officinalis*. Boughrood (43).—*Mentha Nicholsoniana* Strail. Crickhowell and Hay (42);

*Boughrood (43); *Vrowchurch (35). — †*Melissa officinalis* L. Crickhowell (42); Tintern (35).—*Galeopsis Tetrahit* L. *var. *nigricans* Bréb. Near the Three Cocks Junction (42). — *Ballota nigra* L. *var. *borealis* (Schweig.). Abergavenny.— **Cynoglossum officinale* L. Near Boughrood (42). — **Chenopodium polyspermum* L. Three Cocks Junction (42).— **Rumex conglomeratus*. Boughrood (43).—†*Amaranthus retroflexus* L. Hay (42).— **Fagus sylvatica* L. Near Crickhowell, probably planted (42). — **Salix alba* L. Fine trees at Crickhowell (42); Boughrood (43).—*Populus nigra* L. The true Italian species. Boughrood (43); fine trees by the Usk at Crickhowell (42); Abergavenny (35).—*P. deltoides* Marsh. var. *serotina* (Hartig). Abergavenny, &c. (35); near Boughrood (43); Hay, Crickhowell, &c. (42). — **Quercus sessilis* Ehrh. Hay, on the Radnor side, and at Boughrood (43).—**Q. Robur* L. (*pedunculata*). Near Crickhowell (42); Boughrood (43). — **Colchicum autumnale* L. Near Boughrood (43).—*Phragmites vulgaris* (Lam.) *var. *subuniflora* Druce. Tintern (35).—**Festuca rubra* L. Hay, &c. (42).—G. Claridge Druce.

BOOK-NOTES, NEWS, &c.

The title of Mr. F. Cavers's *Life-Histories of Common Plants* (small 8vo, pp. xvi, 363, 123 figs., University Tutorial Press, price 3*s.*) is a little misleading. The earlier portion of it is devoted to a series of physiological experiments on germination, nutrition, growth, &c., in general. Then follow a short chapter on the structure and arrangement of parts in the vegetative bud, and one on flowers, fruits, and seeds, in which the function and structure of these organs are described. The remaining chapters, except a short one at the last on ecology, are devoted to the study of groups of plants illustrating the commoner natural orders, and special reference is made to points of interest in the life-history of the various plants studied. A great deal of information is given or suggested in the form of questions which the student is supposed to solve by reference to the plant itself or by performing some experiment. The chief value of the book would appear to be to the teacher as suggesting a course of experimental work. Occasionally points are a little over-elaborated. Thus it seems hardly necessary to boil stigmas in Fehling's solution as a test for sugar after the ready and simple experiment of placing on the tip of the tongue. The book is produced in the form typical of the series to which it belongs; the numerous figures are mostly line drawings, clear and diagrammatic, though sometimes crude.

We learn that Mr. F. N. Williams has in hand a new *Flora of Middlesex* and that Mr. F. Arnold Lees is engaged upon a new edition of his *Flora of West Yorkshire*.

As we are going to press we hear with regret of the death of Mr. George Nicholson, of whom we shall give some account in an early issue.

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BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

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GEORGE NICHOLSON

GEORGE NICHOLSON, F.L.S.

(WITH PORTRAIT.)

ALTHOUGH of late years his name has been less familiar than formerly to British botanists, the older among us will have learned with regret of the death of George Nicholson, which took place at his residence at Richmond on the 20th of September. Those who knew him personally will regret also the loss of a warm friend and an interesting personality, for all who knew him liked him and those who knew him best loved him most.

George Nicholson was born at Ripon on the 7th of December, 1847. The son of a nurseryman, he was brought up to his father's profession, proceeding to a well-known nursery in Paris and to that of Messrs. Low at Clapton. In 1873 he obtained a post in the Curator's Office in the Royal Gardens, Kew, and, on the death of Mr. John Smith in 1886, he succeeded to the Curatorship.

It was between these dates that Nicholson's connection with British botany was most pronounced. In 1875 he published in this Journal a "Wild Flora of Kew Gardens and Pleasure Grounds," containing 396 species and varieties; a reissue of this, brought up to date, appeared in Additional Series V. of the Kew *Bulletin* in 1906: both his first and last published work was thus occupied with the same subject. From time to time he contributed notes to this Journal, the longest being those on *Spergula arvensis* and *Cardamine pratensis* (1880, pp. 16, 199). Nicholson was not, however, a voluminous writer; he preferred to help other folk, at whose disposal he was always glad to place his own observations, and in this contingency his name is of frequent appearance in the literature of the period indicated. Among critical genera, *Rosa* occupied most of his attention; but it is rather on his general knowledge of British plants that his reputation rests. He contributed useful notes to the Reports of the Botanical Exchange Club, of which he was a member, and edited those for 1883 and 1887. In that for 1883 (published in 1885) he described the hybrid *Scutellaria galericulata* × *minor* named and figured by Taubert (Verhandl. Prov. Brandenburg, xxviii. 25 t. 2) as *S. Nicholsoni*. In the 1887 Report (published 1888) the Abbé Strail describes *Mentha Nicholsoniana*,* from specimens collected in Herefordshire by the Rev. A. Ley, which were sent by Nicholson to the Abbé for his opinion. He is further commemorated by *Fissidens Nicholsoni*, described by Mr. E. S. Salmon (Ann. Bot. xiii. 123, t. vii. figs. 81–91, 1899) from specimens collected by Nicholson in one of the Kew greenhouses, where it grew on the stem of a tree fern brought from Jamaica; his help is acknowledged by Mr. Salmon in his list of Kew mosses published in the

* The reference in *Index Kewensis*, First Supplement, is to the Report for 1890, p. 307, but the description of the plant will be found as above.

Kew *Bulletin* already referred to. In 1901, on his retirement from Kew, Dr. Udo Dammer gave him a double commemoration in a new palm from Central America, which he named *Neonicholsonia Georgei*.

His work among British plants, however, good though it was, represented a very small portion of his activities, and indeed, as has already been said, fell into the background when he became Curator of the Royal Gardens. The year before his appointment he had begun the publication of *The Dictionary of Gardening*: this, of which he was editor, may be regarded as his most important work. It was concluded in 1889: the last volume contains a "pronouncing dictionary" of Latin plant-names by the Rev. Percy W. Myles, a genial Irish parson much interested in botany with whom he had become acquainted, and in whose company Nicholson and I spent many delightful evenings. The *Dictionary*, although in matters of illustration and general get-up leaving much to be desired, remains a standard work of reference; a Supplement was issued in 1900-1, but the curious "publisher's preface" does not indicate that Nicholson took part in its production. In periodical literature he was a frequent contributor to the *Gardeners' Chronicle* and to the earlier volumes of the *Garden*; of the latter a volume (xlviii. 1895) was dedicated to him with an appreciation of his work and a portrait, which was reproduced in this Journal for February, 1896. It was a good likeness, but did less than justice to Nicholson's pleasant features and kindly expression; these are more accurately rendered in the portrait which by the kindness of the proprietors of the *Gardeners' Chronicle* is now reproduced.

In 1893 Nicholson was sent to attend the International Horticultural Exhibition at Ghent and in 1894 to the Colombian Exhibition at Chicago, at which time various journeys gave him the opportunity of studying the trees of the United States: he published accounts of these visits in the Kew *Bulletin*. The knowledge he acquired during this visit was of great service to the Kew Arboretum, which was under Nicholson's special charge, and remains a monument of his work. In 1894 was published the first instalment of the *Hand-list of Trees and Shrubs* grown in the Arboretum; this was completed in 1896, and proved so useful that a second and revised edition, in one volume, was issued in 1902. According to a custom which prevailed at Kew during Sir W. T. Thiselton-Dyer's directorate, this work was issued anonymously, although it was generally known that Nicholson was responsible for it; and indeed no one at Kew except himself had the knowledge required for its compilation. This edition may be regarded as Nicholson's last official work, as his failing health caused him to retire from the Curatorship at the end of July, 1901.

Although it is thus evident that Nicholson has many claims to a place in the memory, no account of him would be complete without some reference to the many charming qualities which endeared him to those who had the pleasure of knowing him. My

own intimate acquaintance with him began in the late seventies, when I was living at Isleworth, and extended until some time after I had left there for South London in 1884. Our drifting apart was due only to the fact that each of us was more than fully occupied, and had little time for visiting which involved a railway journey; our friendship, however, was unchanged, and his occasional visits to the National Herbarium were, I think, as pleasant to him as they were to me. He was one of the most delightful men I have ever known—of wide knowledge and taste, enthusiastic and sympathetic in temperament, always ready to do a kind thing and to spare himself no trouble in doing it. During my residence at Isleworth I was much interested in a club composed mostly of Irish lads working in the market gardens; to this Nicholson was a frequent and always a welcome visitor, equally popular with the lads themselves and with the dignified elderly representative of an old English Catholic family under whose ecclesiastical supervision the club was constituted. His position at Kew enabled him to find places for some of the more promising lads in the Royal Gardens, where they did exceedingly well; in these he took a personal interest, devoting much time to teaching one or two of them French. At this period he became greatly interested in Irish affairs—he was always a strong Liberal in politics—and a visit which we paid to Dungarvan, co. Waterford, in the early summer of 1882 confirmed this interest. Here, as usual when he was in the country, Nicholson did a good deal of collecting: a set of our specimens is in the National Herbarium. About this time his fondness for music found a new enthusiasm in the works of Richard Wagner, who was then just becoming known in England. In the early summer of 1885 we paid a delightful visit to M. César Chantre—a frequent visitor to England and friend of Nicholson, with whom he was associated in the finding of *Utricularia neglecta* in Middlesex (see Journ. Bot. 1883, 85)—at Lyons, whence we botanized at Grenoble and the Grande Chartreuse. During this journey he showed much enthusiasm for mountain climbing, the pursuit of which afterwards laid the foundation of the heart trouble which, during his later years, caused him much suffering and to which he ultimately succumbed at his residence at Richmond on the 20th of September.

Nicholson was elected an Associate of the Linnean Society on December 16, 1886, and became a Fellow on May 5, 1898. In 1894 he was awarded the Veitchian Medal of the Royal Horticultural Society for his services to horticulture. His herbarium of British plants he presented some years back to the Aberdeen University, whose Professor of Botany, Dr. James H. Trail, was one of his intimate friends.

JAMES BRITTEN.

NATIVES AND ALIENS.

By the Rev. E. Adrian Woodruffe-Peacock, F.L.S.

The modern scientific spirit makes us seek for an exact explanation of all the phenomena we observe in nature. The presence of any species of plant on the soils it frequents and in the localities it prefers imperatively demands a solution in these days. A more flexible and natural method of observing and recording facts than has been employed up to date of the last publication on this subject—Mr. S. T. Dunn's *Alien Flora* (1906)—will have to be employed to collect the mass of exact information required.

For the time being, as Mr. Dunn laments, there is little enough of the right sort of floral records in print. The result of this deficiency is that many of the arguments used and conclusions drawn in existing works are founded on a misunderstanding of even general laws, and a false appreciation of the simplest facts of nature.

Before we are in a position to say of a given area what are natives, semi-aliens, or aliens—or, as I should prefer to call them, in order to avoid old associations, areal, local areal, or extra-areal species—we must master all the conditions of growth of the species we are considering. Speaking generally, plants require (1) room to grow; (2) the absence, more rarely the presence, of shade from other species; (3) an open or disturbed soil; (4) a proper supply of plant food. Mr. Dunn's "unnatural supply of plant-food" (Introduction, p. xi) is apparently a pure chimæra. If it existed as a fact, garden soils, which are far richer in available plant-food than agricultural soils, should exhibit a change of flora, or at least another frequency when the species remained the same, but the most refined analysis I have systematically applied to both for years proves there is practically no distinction between them. Plants, too, which are generally found frequenting such soils as form garden ground and tilth grow equally well on naturally broken ground, such as is found on stream-sides, escarpments, and open wind-drifted soils. I can prove this from the tens of thousands of exact rock-soil notes I have already arranged. As a rule, too, monocarps in their short and hurried life are much more exacting than polycarps in the conditions they demand. They alone practically frequent tilth, for perennials such as *Agropyron repens* are not true exceptions. The absolute conditions required by any species can only be fully analysed when the most exact records have been obtained over the whole area of its growth. For example, Mr. Dunn says (*l. c.*):—"Thus hedges afford an occasional disturbance of the ground in the process of cleaning the ditches and remodelling the banks. This seems to be all that is required to attract the white dead nettle, for instance, from its home in Southern Europe over most parts of the Continent, and as far as England." A more unfortunate example could hardly have been selected than *Lamium album*. I verily believe that not

one single fact in this illustration from the introduction, which outlines the method of analysis used in the work, is true to nature in England.

"The process of cleaning the ditches and remodelling the 'hedge' banks," presumably was meant, but this has the most trifling influence, practically nothing to do with the love certain species show for village hedges. The majority of such places have no ditches, even in fenny Lincolnshire, and many have no banks and are never cleaned, and still they are frequented. Theorising is mighty easy work; collecting facts painfully slow. Here they are for this case, for *L. album* has not defeated my analysis as some species have up to now. The soil is light and open under hedges, like all soils which are not trodden by men and cattle. Moles, mice, voles, worms, &c., work along them continually. When the summer's burning heat or winter's frost grips the open unshaded and unprotected ground animal life is driven to the cover of the hedges. *Agropyron repens*, which infests most hedges, however plentiful it may be in tilth disappears when an uncleaned field is sown down to permanent pasture, or "tumbles down" as is more frequently the case. Only once in thirty years' observing have I found this species in old permanent grass. I have seen tens of thousands of acres go down to pasture full of it, along with the annual Veronicas, Lamiums, &c., yet out of the fences or freshly disturbed ground not a specimen of any one of them could be obtained to-day. The annuals had been forced out by stronger growing competitors and the consolidating of the soil by the tread of mammals. The latter alone had driven the twitch grass away to the hedges, where anyone will allow there is competition enough.

The plant selected by Mr. Dunn for the purpose of illustrating his theory is the perennial *Lamium album*. My arranged rock-soil notes on this species number two hundred and twenty-five sheets, taken off the following twenty-eight soils and combinations. The compound soils I shall ignore here as beside my purpose:—

Soils.

1. Blown sand	5	15. Lower lias clay	6
2. Chalky boulder clay ...	35	16. Marlstone	11
3. Cornbrash	3	17. Middle lias clay	2
4. Estuarine alluvium ...	13	18. Old river gravel	4
5. Fen gravel	3	19. Oxford clay	17
6. Freshwater alluvium...	16	20. Peat	6
7. Hessle boulder clay ...	1	21. Purple boulder clay ...	9
8. Hibaldstow limestone	7	22. Rhætic shale	1
9. Keuper marl	4	23. River gravel	4
10. Kellaways rock	2	24. Sandy glacial gravel ...	43
11. Kimeridge clay	5	25. Spilsby sandstone	4
12. Kirton limestone	7	26. Tealby clay	1
13. Lincolnshire limestone	8	27. Upper chalk	3
14. Lower chalk	3	28. Upper lias clay	2

This list does not contain all the rock beds of the county, to say nothing of the drift, only the soils I have notes arranged for on the rock-soil method; but full notes of any two heavy or light rocks—such as I have for the chalky boulder clay and sandy glacial gravel—are much more informing than casual notes taken from a whole series of beds. In one case all the circumstances of growth can be analyzed, in the other only the special records that have been obtained. It is perfectly safe, I find, as a matter of experience to reason by analogy from one bed to another—in a word, to note down what circumstances you expect to find on an unworked soil before you visit it. In ninety-five per cent. of cases your surmises will turn out correct from the known to the unknown bed. Nature is wonderfully uniform in operation—shall I say, mechanically so? The other five per cent. of variation is enough to give interest and piquancy to the subject. No one can say when and where he will meet with the exceptions to the laws he has discovered, proving the existence of others he little suspected.

The notes on the rock beds in the above list have been made in Lincolnshire and in the neighbouring counties. They conclusively prove at a glance—ignoring for the time the frequency of this species on the soils, which is too long a subject to enter on now—that the white dead nettle is not confined to villages, or to their banks, ditches, hedges, or wall roots. It is limited, as every known plant is, by certain conditions, and the purpose of the rock-soil method is to discover what these conditions of limitation are for every species. The sheets prove at once that *L. album* is not confined to man's immediate neighbourhood, only to such conditions as are most frequently found in or near villages. As my notes have been collected for another purpose—a Rock-soil Flora of Lincolnshire—surely they may be relied on to reflect the truth. Here are the facts. Every soil I have had time to work has been analysed, and all combinations of soils met with, from clays like the heavy Keuper marl and Kimeridge clay to Eolian sands and the freshwater alluvium of beck banks. The position of *L. album* seems to have little to do with the chemistry of soils, but everything with their mechanical state, and the stock found on them—cattle and sheep especially. It is not as a rule to be met with in pasture or meadow. The stock destroy it in both, they love it so as food. In pasture, however, it can keep a footing where it is protected by nettle-beds, or more rarely by the common field thistle. In meadows these conditions are absent, and though not seriously hurt by the annual mowing, it is quite destroyed by "the aftermath pasturing." This can be proved quite simply when full rock-soil notes have been obtained of all localities. Churchyards as a rule are annually mown once or twice, and *L. album*, where they are never stocked, forms a very large percentage of their flora—one-eighth sometimes on light soils such as sandy glacial gravel. There is, however, a difficulty about them; they are usually well within the villages. Some other localities must be found where stock does not graze. Orchards which are meadowed

but unstocked furnish the same evidence, but they, too, are generally near human dwellings. The beck banks of the Fenland supply the conditions we require. They are well away from the villages. The streams now in many cases run on a level with the black-land they protect; therefore they have to be guarded by soak-dykes to carry off the water that sipes through the light sandy alluvium when the becks are bankful. Stock are not permitted on them on account of the damage they do, therefore *L. album* flourishes.

When all my rock-soil notes that are as yet arranged for this species are examined and analyzed, its summary seems to be as follows. *L. album* cannot stand the competition of close pasture without help. It cannot survive long in heavily cut and stocked meadow, or live with rampant species of larger growth in woods and hedges. It cannot exist as an under-shade species in close canopied woodland, even on an open soil, or on well-trodden wood-rides. Unstocked meadow on light soils seems to be its native home, along with stream-banks and hedgerows. All things considered, the latter is the locality where most English botanists observe it and expect to find it, for in a country as fully stocked as England, meadow that is not pastured during the year is rare. It is driven perforce from its natural home by cattle, and as a rule has to become a hedgerow plant on roadsides. Most of our country roads are pastured in the summer, so it is finally driven from them. In villages alone where stock is not usually allowed to graze it finds a resting-place in fair security. The trampling feet of children come too rarely to seriously injure it on the banks and hedgerow sides; and the scythe—no species grows and recovers more quickly after it has been cut down—once or twice a season prepares for it a fit abiding place by keeping in check stronger growing competitors.

Now when we turn to Mr. Dunn's remarks on this species in the body of his work we discover that it is a "native in woods and forests from Spain and Morocco to Siberia and Himalayas." England then, or at least its eastern portion, is not clearly outside its area of range. "Woods and forests," however, imply whole cycles of rock-soil conditions more than bewildering to the true student, according as they possess peculiarities of soil, moisture, elevation, exposure, and "openness or closeness, stocking, &c." So much is this the case that we are just as wise as we were before we possessed this information. In practice, where does it land us? Does this species abroad, under the same conditions of cultivation and stocking, take up a different position to that found here in Lincolnshire and other counties of Eastern England where I have carefully observed it? Under other conditions here it would take a very different place. It cannot stand heavy grazing and seeks the protection of the nettle; but if the nettles are not mown annually, it is overshadowed. It is found growing freely in orchards, quarries, stream-banks, hedges, and in old wood-rides where they are open and with little undergrowth and stock of rabbits. It is not found in new woods, for they lack two essential

conditions as a rule: (1) the required soil state; and (2) freedom from strong competition, *i. e.*, open canopy conditions. On the other hand, it may be found anywhere and everywhere when the circumstances are suitable, even on the decaying capping of old mud-topped walls.

L. album is Mr. Dunn's own chosen illustration in his preface. Any other species found on the varying soils of Lincolnshire would have been the same to me. I have the facts about them all, even when I cannot rationalize them into a theory on account of seeming contradictions. Had the species selected by Mr. Dunn been *Ballota nigra*, I could not have used my analysis to reply to his method of comparison, though it has been as fully studied as *L. album*. The material is usually sufficient when full rock-soil notes of three or four soils, stating precisely the locality and frequency for every species, have been obtained, but this is not the case always. At times when the sheets are analyzed, it becomes clear that finer distinctions must be drawn. Stocking and overshadowing, for instance, for *L. album*. In the case of *Ballota* I have not yet discovered what are the critical conditions. My notes *seem* to indicate that to a certain extent it is a follower of the rabbit—a sandy soil species.

Does the following definition from the introduction of the *Alien Flora*—"A species which exists in perfectly wild and natural surroundings, both here and in the neighbouring parts of the world, is deemed indigenous"—bring us any nearer settling the truth about the nativeness of *L. album* or of anything else? It certainly does indirectly if it shows us that we require more exact data than we possess either here or from abroad. It also certainly proves that it is the height of folly to compare the incomparable.

Let us look with unbiased vision at the facts found in an old country like England. I will take Lincolnshire in illustration, because I know it better than any other part of the country. To begin with, it is the largest botanical area, with the single exception of West Yorkshire, which will be treated in one flora, and yet, after working it for thirty years, I do not believe there is a truly native habitat, unsullied by man's potent influence, in its 2787 square miles of surface. It is the most highly cultivated county in the kingdom, for it possesses unrivalled soils in the British area, and in consequence is the most changed. Man with us has shaped the course of nature so long in making artificial salt-marshes, and the collecting banks of marine sand-dunes, or by draining bogs, &c., especially since the great inclosure, following on the growth of the turnip as a field crop for wintering sheep—dating from 1797—that everything has become more or less artificial. Why not recognize the position at once?

Yet with definite human characteristics everywhere, from the reclaimed silt and drained peat to the highest point of the wold and cliff hills, everything is natural enough within certain bounds. Man, when regarded from the right standpoint, is no more an outside disturber in nature than the placid bullocks and quiet

sheep, which make the pasture so different from the meadow flora by continual grazing. The human species causes a little more trouble perhaps with a half-knowledge in relegating the wider circle of its influences into the proper category of more permanent or transitory fluctuations, nothing more. For surely man is as natural an influence on our rich soils as the long-wool sheep that crops, and thereby changes the herbage of its native hills, or as the peregrine falcon sowing oak, beech, or barley in the ash woods of the liassic clays, from the torn crop of a ringdove that had obtained a full meal on the escarpment of the wolds, and had been overtaken as it returned to roost. It is all very well for the sake of expediency and simplicity to make a distinct division, as between the British and South Kensington Museums, and to say, "Here man and man's work; there nature and nature's work." No such distinction exists in reality, nor can one be made in botany without violating the first principle of true observation, namely, that "what is found is natural."

Indirectly H. C. Watson tried to simplify the riddle, but the mesh of the net he used for the purpose was too wide to catch all the fragments of information required for a satisfactory explanation. He showed us the way, however, if he did not arrive at the goal, or go very far on the road himself. All honour to him! Much though I admire his patient industry and methods, he singularly fails in getting at the truth he was indirectly seeking, despite his highly developed logicality. The terminology he employs is defective, for it is unusually difficult in application. The great error of his method is in treating species *per se*, as if they had a mind of their own, as natives, denizens, colonists, or casuals, rather than in their varied relation to man, the great disturber. The astonishing thing is that such a time should have elapsed without a more natural method being suggested.

We must put the Watsonian distinctions from our mind, and turn to a more natural method. Let us try arranging all the species in any flora we know well under the following heads—remembering, as we do so, in England there is nothing *natural if you exclude human influence*, and that without accurate rock-soil notes exact classing is almost impossible.

Followers of:—

(1.) Man.

(2.) Cultivation.

(3.) Commerce (the unusual flora of railways and canals being so classed).

Frequenters of:—

(4.) Pasture.

(5.) Meadow.

(6.) Woodlands (open, close, old or new).

(7.) Hedges (distinguishing between roadside, grassland, and tilth hedges).

(8.) Roadsides (distinguishing those over grass or tilth).

(9.) Stream-banks.
(10.) Moorlands (*i. e.*, where *Calluna*, *Erica*, *Pteris*, &c., are the predominant species).
(11.) Broken ground (whether natural, as on escarpments, stream-sides, or caused by man—but not for cultivation).
(12.) Lakes or ponds.
(13.) Streams (rapid or slow).
(14.) Sand-dunes (inland or marine).
(15.) Salt-marsh (natural or artificial).
(16.) Elevation (above Ordnance datum).

Many other clever distinctions could be made, but the fewer the better. Then, as a species stands in these categories, its position of dependence on or of less dependence on man declares itself. For instance, *Amsinckia lycopsioides* appears under 2 and 3. It is found in growing cereal crops and round flour-mills, and never ripens its seeds. We have three species of *Narcissi* in Lincolnshire, but all come in category 1. *L. album* has a far wider range; here it is—1, 2, 3 (banks of railways and canals), 4 (rare), 6 (old—open), 7, 8, 9, 11. Do we doubt about its position? Compare it with the record of other species—*Alopecurus pratensis*, say. Here is its record: 1, 4, 5, 6, 7, 8, 9. If that does not settle the point satisfactorily, compare it with the standing of all the species in the list of pre-glacial plants Mr. Clement Reid's geological analyses have furnished us with (Journ. Linn. Soc. (Bot.) xxxviii. 206). If that does not satisfy any one as a near approximation to the truth, the problem appears to me to be insoluble. For the rock-soil method of necessity collects all the facts Mr. Dunn laments he could not discover in local floras. It summarizes, too, in the shortest compass what it has to say. Of a mountain plant, for instance, that it does not grow below or above a given elevation, that it requires a peat bog, dry peat, granite, or other soil, as the case may be, and is soon exterminated by grazing sheep, deer, or smoke. In the fewest words it gives the facts, one and all, declaring, under the conditions it records, where every species does and therefore does not grow—not can or cannot exist under other circumstances found elsewhere or abroad, which is quite another matter—and incidentally proves that man has been the predominant factor so long in any old country like England, that the terms "aboriginal," "native," or "indigenous," used of modern conditions, simply lead to mental confusion instead of perspicacity in definition. It proves much more, but enough has been said for the time being.

Let me add here in conclusion, lest I should be mistaken, that I am not reviewing Mr. Dunn's book; I am only applying a more exhaustive array of facts than is found in any work to criticize its method. The *Alien Flora* contains a mass of most valuable information, and I, like many others, thank the author for it.

INVERNESS-SHIRE CRYPTOGAMS.

By Albert Wilson, F.L.S., and J. A. Wheldon, F.L.S.

In July this year we spent a few days in East Inverness-shire, making Aviemore our headquarters. Our original intention was to examine some of the principal summits of the Cairngorm range, but this was to a large extent frustrated by the extremely unfavourable weather conditions which prevailed during our visit. Fortunately the great Forest of Rothiemurchus provided an attractive alternative to the mountain peaks, and we gave it more attention than would have been the case had the mist and rain permitted us to spend more time on the mountains.

This extensive forest tract has an area of nearly one hundred square miles, and we traversed it in several directions by intricate paths between Aviemore and the foothills of Ben Macdhui and Braeriach, which abut on the Larig Ghru and Glen Eunach. The forest land is much undulated, and in most parts thickly covered with trees, the dominant ones being in some places spruces and Scots pine, and in others birch. On some of the hill slopes there are considerable areas of natural birchwood. There is a rich undergrowth of shrubby vegetation, the juniper being especially prominent, with it occurring *Erica cinerea*, *E. tetralix*, *Calluna vulgaris*, *Vaccinium Myrtillus*, *V. Vitis-idæa*, *V. uliginosum*, *Arctostaphyllos Uva-ursi*, and in some parts *Genista anglica*, *Ulex europæus*, and *Rubus Idæus*. None of the fruticose Rubi were observed. The herbaceous plants, whilst partaking strongly of the ericetal-moorland type, presented features that were novel to us. The following plants occurred in profusion, and often in close association:—*Trientalis europæa*, *Galium saxatile*, *G. boreale*, *G. verum*, *Carduus heterophyllus*, *Juncus squarrosus* and *Scirpus cæspitosus*. The commonest *Euphrasiæ* were *E. Rostkoviana*, which abounded in the forest and by roadsides about Aviemore, and *E. gracilis*, whilst *E. scotica* was occasionally seen with the latter species. We looked in vain for *E. nemorosa*, usually in Lancashire the most abundant species in all kinds of situations. *Pyrola media* occurred on some open healthy ground near Aviemore, and *P. minor* in the forest near the road to Loch Eilean. *Rumex aquaticus* abounded everywhere near Aviemore by roadsides, ditches, and in damp fields, almost entirely supplanting *R. crispus* and *R. obtusifolius*, although both the latter were seen. By the river Spey, near Aviemore, we observed *Carex aquatilis* and *Myriophyllum alterniflorum*.

The predominant moss of the drier parts of the wood was *Hylocomium splendens*, with *Hypnum Schreberi* and other common species forming a luxuriant carpet; and in the wetter places the *Sphagnaceæ* flourish in great variety. The branches of the junipers were richly clothed with *Orthotricha* and *Ulotæ*, although the latter occurred but rarely, if at all, on the pines and birches. *Dicranum fuscescens* was abundant and fruiting

freely, both on tree trunks and on the ground, and *D. strictum* occurred more locally, but still in plenty though, as usual, sterile.

Amongst lichens the *Cladoniæ* were remarkably fine and varied, especially on the higher fringes of the forest, and mingled with the fruticose species were luxuriant fruiting patches of *Bueomyces rufus*, and *B. icmadophilus*. The coniferous trees and birches were well clothed with *Parmeliæ* and *Everniæ*, as also with *Usnea* and *Alectoriæ*, but the *Ramalineæ* were apparently restricted to deciduous trees other than birch. On sycamore and lime they attained a great size, some specimens of *R. fraxinea* having a length of six inches.

Beyond the range of the forest the granite hills and moorlands were only very partially explored, and although some of the Sphagna and the commoner mosses grew in abundance, the moss flora was far from being so rich as it is on the mica-schist. The western slopes of Braeriach, only imperfectly examined in mist and rain, yielded some interesting plants, amongst the heather being *Rubus Chamæmorus*, *Cornus suecica*, *Vaccinium uliginosum*, *Lycopodium clavatum*, and *L. annotinum*. On higher rocky ground, between 3000 and 3500 feet, we noticed *Trollius europæus*, *Cerastium alpinum*, *Cochlearia alpina*, *Silene acaulis*, *Sibbaldia procumbens*, *Gnaphalium supinum*, *Veronica alpina*, *Luzula spicata*, *Juncus trifidus*, and *Carex rigida*. From 3500 to 4000 feet on the lower portion of the summit ridge the ground is very unproductive, consisting of bare stretches of crumbled granite, in which *Juncus trifidus* and *Salix herbacea* were almost the only representatives of the higher plants, and the cryptogamic flora consisted of isolated tufts of *Rhacomitrium lanuginosum*, *R. heterostichum* var. *gracilescens*, *Dicranum scoparium* var. *turfosum*, *Conostomum boreale*, *Cladina uncialis* f. *obtusa*, and *Thamnolia vermicularis*. On similar ground on Creag na Leacainn, the north shoulder of Ben Macdhui, *Platysma nivale* and *Cetraria islandica* were plentiful. Perhaps the most striking feature of the district was the abundance of the *Gyrophoræ*, which occurred on almost every stone and boulder, from the valley to the summits of the hills.

The only alien plants observed were *Bromus mollis* var. *glabrescens*, which occurred near the lower bothy in Glen Eunach, and was no doubt introduced with fodder; and *Carum Carvi*, seen on the railway embankment near Aviemore station.

The following is a list of the more interesting mosses, hepatics, and lichens observed, those of the first two groups having an asterisk prefixed, when they are not indicated for East Inverness-shire in the Census Catalogues issued by the Moss Exchange Club. The small number of alpine mosses gathered is not to be considered exhaustive for the district, as we were unable to select desirable localities for search owing to the heavy rain and dense mists encountered on the two occasions on which we ascended the mountains.

We have to express our thanks to Mr. Symers Macvicar for assistance in determining the more critical *Hepaticæ*, several of

which appear to be new to the county list; and also to Mr. H. N. Dixon for the note on *Mnium punctatum*.

Sphagnaceæ.

**Sphagnum Girgensohnii* Russ. Near the entrance to Glen Eunach.—* Var. *xerophilum* Russ. West side of Braeriach at 2700 ft.

**S. Russowii* W. var. *virescens* Russ. Glen Eunach.—* Var. *pœcilum* Russ. Rothiemurchus Forest.

**S. Warnstorfii* Russ. In the forest near Glen Eunach.

S. rubellum Wils. Abundant both in the forest and in wet gullies on the mountains. The * vars. *flavum* C. Jens., * *purpurascens* Warnst., * *rubrum* Grav., and * *viride* W., were not unfrequent; * var. *versicolor* Russ. In the Larig Ghru.

**S. fuscum* Klinggr. var. *fuscescens* W. Abundant in parts of the forest near the foot of Castle Hill; slopes of Braeriach towards Glen Eunach.

**S. acutifolium* R. & W. Frequent. Of the forms collected, * vars. *versicolor* W. and **flavo-rubellum* Warnst. occurred in Rothiemurchus Forest, and *var. *chlorinum* W. in Glen Eunach.

**S. subnitens* R. & W. Frequent, especially the *vars. *virescens* W., and **versicolor* W. At the entrance to Glen Eunach *var. *flavescens* W. grew in abundance, and on Braeriach at 3200 ft. *var. *flavicomans* Card. in large tufts. The *var. *violascens* W. was seen in one place in the Larig Ghru Pass.

S. teres Angstr. Glen Eunach.

**S. cuspidatum* R. & W. *vars. *plumosum* Nees & Hornsch. and **submersum* Schimp. Rothiemurchus Forest.—*Var. *falcatum* Russ. In the Larig Ghru.

**S. pulchrum* Warnst. Only seen in a small patch of boggy ground at the foot of Castle Hill.

**S. recurvum* R. & W. var. *mucronatum* W. Frequent in Rothiemurchus Forest and Glen Eunach.—*Var. *amblyphyllum* W. Near Loch Eilean, and between the upper bothy and Loch Eunach.

**S. parvifolium* W. With *S. acutifolium* in Glen Eunach.

S. molluscum Bruch. Rothiemurchus Forest.

S compactum DC. var. *imbricatum* W. Castle Hill, Creag na Leacainn, lower slopes of Braeriach, and in Rothiemurchus Forest, plentifully.

**S. subsecundum* Limpr. Rothiemurchus Forest.

**S. rufescens* W. Common throughout the district.

**S. crassicladum* W. Foot of Castle Hill, and sparingly in the wetter parts of Rothiemurchus Forest.

**S. imbricatum* (Hornsch) Russ. var. *cristatum* W. In the forest near the entrance to Glen Eunach, and intermixed with it a form approaching var. *sublæve* W., but having the comb fibrils well developed in the basal cells of the leaves.—*Var. *affine* f. *squarrosula* W. (*S. turfaceum* W.). Rothiemurchus Forest.

**S. cymbifolium* W. var. *glauco-flavescens* Russ. Near Loch

Eilean—*Var. *glauco-pallens* W. Frequent in the forest, and also seen in Glen Eunach.—*Var. *glaucescens* W. Near Loch Eilean.

S. papillosum Lindb. Very frequent, and gatherings brought home included both vars. *normale* W., and **sublæve* Limpr.—*Var. *conferta* Lindb. Ascent of Braeriach from Glen Eunach.

Musci Veri.

Andreæa petrophila Ehrh. Frequent.—*Var. *alpestris* Thed. Creag a Chalamain.—*Var. *gracilis* B. & S. Amongst *Rhacomitrium heterostichum* var. *gracilescens* near the summit of Braeriach.

A. alpina Sm. Braeriach at 2500 ft., &c.

Oligotrichum hercynicum Lam. Frequent on the hills. Fruiting freely on Braeriach at 3000 ft.

Polytrichum alpinum L. Fruiting on Braeriach at 2200 and 3000 ft.

**P. formosum* Hedw. Near Loch Eilean.

**P. commune* var. *minus* Weis. Open moorland near Aviemore.

Cynodontium Bruntoni B. & S. Craig Ellachie, both the typical plant and a form with somewhat asymmetric capsules and a faint rudimentary struma. Apparently analogous to the var. *obliqua* of *Weisia microstoma*.

Dicranella heteromalla Schp. Ascends on Braeriach to 3200 ft.

D. squarrosa Schp. Frequent.

Campylopus flexuosus Brid. and *C. pyriformis* Brid. Rothiemurchus Forest.

Dicranum Starkei W. & M. Braeriach, from 2400 ft. to 2900 ft.

**D. scoparium* Hedw. var. *turfosum* Milde. Near the summit of Braeriach, from 3700 ft. to 4100 ft. extending into S. Aberdeen, for which vice-county also there is no record.—Var. **orthophyllum* Brid. Healthy ground near Aviemore.—Var. *alpestre* Haeben. On Braeriach at 3600 ft.

D. fuscescens Turn. Abundant and fruiting freely on trees and on the ground in the forest tract. On Braeriach at 2500 ft.

**D. strictum* Schleich. Very fine on the trunks and branches of trees in Rothiemurchus Forest, near the approach to Larig Ghru.

Grimmia patens B. & S. Fruiting on Braeriach at 2400 ft.

G. Doniana Sm. Creag a Chalamain, and Glen Eunach.

**Rhacomitrium protensum* Braun. Slope of Braeriach towards Glen Eunach.

**R. heterostichum* Brid. var. *alopecurum* Hübn. Creag na Leacainn and on Braeriach at 3800 ft.—Var. *gracilescens* B. & S. Plentiful on Braeriach at from 3000 to 4000 ft.

R. lanuginosum Brid. Up to 4100 ft. on the south-west side of Braeriach, with the preceding, *Dicranum scoparum* var. *turfosum*, and *Conostomum boreale*. These appeared to be the only four species able to thrive with any degree of luxuriance on the extensive areas of pulverised granite met with on this exposed shoulder of the mountain.

**R. canescens* Brid. The type on moorland near Aviemore.

Hedwigia ciliata Ehrh. Frequent, fruiting.

**Tortula muralis* var. *rupestris* Schultz. On mortar near Aviemore.—Var. *incana*. On the railway bridge near Aviemore station.

**Barbula rigidula* Mitt. Wall between Inverdruie and Loch Eilean.

Trichostomum tortuosum Dixon. Only seen on Craig Ellachie.

**Eucalypta streptocarpa* Hedw. Seen once only on a wall between Inverdruie and Loch Eilean, on mortar. It is remarkable how a rarely fruiting species reaches the lime of walls and bridges at considerable distances from the calcareous rocks which are its natural habitat.

**E. ciliata* Hoff. Near Loch Eilean.

**Ulota Drummondii* Brid. Plentiful in the forest, especially near Loch Eilean, growing principally on junipers and deciduous trees.

U. Bruchii Hornsch. Common in the forest, and on trees about the lower part of Glen Eunach.

U. crispa Brid. Occasionally with the preceding.—*Var. *intermedia* Braithw. Trees near Loch Eilean.

**Orthotrichum cupulatum* Hoffm. Larig Ghru.

O. leiocarpum B. & S. Very fine on trees by the road leading from Aviemore to Loch Eilean.

O. affine Schrad. Frequent. A robust form, approaching *O. speciosum* in habit, occurs on trees with the preceding.

Tetraplodon mnioides B. & S. and *T. angustatus* B. & S. By the roadside in Glen Eunach, near the lower bothy.

Conostomum boreale Swartz. Near the summit of Braeriach at 4000 ft.

Bartramia pomiformis Hedw. and *B. ithyphylla* Brid. Craig Ellachie.

Philonotis fontana Brid. and *var. *ampliretis* Dixon. Stream on Braeriach at 2400 ft.

P. seriata Mitt. Stream flowing from Braeriach to Loch Eunach at 2500 ft.

Breutelia arcuata Schp. Creag a Chalamain.

Webera cruda Schwaeg. Near Loch Eilean, and Larig Ghru.

**W. nutans* Hedw. var *longiseta* B. & S. Glen Eunach.

**W. annotina* Schwaeg. Glen Eunach.

W. albicans Schp. A large form approaching var. *glacialis* on Braeriach.

Bryum pseudotriquetrum Schwaeg. Fruiting amongst stones on the shore of Loch Eilean, associated with *Blindia acuta*.

B. alpinum Huds. Braeriach.

**B. argenteum* L. Very sparingly near Aviemore station.

Mnium punctatum L. A curious and distinct-looking form occurs in some plenty near the shore of Loch Eunach. The plants grow in a scattered gregarious manner, and are rigid both when fresh and dry. The leaves are small and very convex, the incurving of the margins often extending to the apex, rendering it cucullate. The strong cartilaginous margin and nerve are of a

deep reddish-brown colour, the nerve itself being remarkably broad at the base and rapidly narrowing above so as to have a broadly triangular shape, and it mostly vanishes before reaching the apex. Cells small and thick-walled, very markedly smaller towards the margin. Apparently dioicous, our plants being all male. Our first impression was that it was a distinct variety of *M. punctatum*, or perhaps an arctic form of *Cinclidium*. Mr. Dixon, who is more familiar with the alpine forms of mosses than we are, has seen intermediate forms and suggests that it requires further study, and therefore we refrain from giving it a name. He says, "although it is very striking in its characters, I believe it to be a form of *M. punctatum*. The late Mr. Whitehead sent it me from Ben Lawers as *Cinclidium arcticum*. I gathered it well-marked on Craig Cailleach, also in a very strongly marked form in the Black Mountains, Brecon, but there it was the female plant. Another plant, from Merionethshire, which I gathered with Mrs. Bradford, had the concave leaves, but the general habit was much freer, and as large as *M. punctatum* generally is; and on the whole I do not think there is anything definite to separate it from *M. punctatum*, although I do not feel clear as to whether it is a variety or dwarfed form."

**Brachythecium rivulare* B. & S. By a stream in Glen Eunach.
**B. populeum* B. & S. Between Inverdruie and Loch Eilean.
**Eurynchium Stokesii* Brid. Near the foot of Castle Hill.
**E. rusciforme* Milde. Stream in Glen Eunach.
Hypnum exannulatum *var. *purpurascens* Schimp. Glen Eunach.
H. uncinatum Hedw. Fruiting abundantly by the roadside between Aviemore and Loch Eilean.
**H. cupressiforme* L. var. *minus* Wils. Very fine on birches in the Larig Ghru.—*Var. *tectorum* Brid. Near Aviemore.
**H. callichroum* Brid. Rothiemurchus Forest.
H. ochraceum Turn. *var. *uncinatum* Milde. Stream on Braeriach at 2500 ft.
H. sarmentosum Wahl. Creag na Leacainn and Glen Eunach up to 2500 ft.

Hepaticæ.

**Aneura pinguis* Dum. var. *angustior* Hook. Glen Eunach, amongst *Sphagnum*.
Pallavicinia Blyttii Lindb. On Braeriach, at 2900 ft., in crevices of rock by a stream flowing into Loch Eunach, abundant and showing inflorescence.
Gymnomitrium obtusum Pears. Braeriach and Creag na Leacainn.
**G. crassifolium* Carr. Braeriach at 3400 ft.
Marsupella emarginata Dum. Frequent.
**M. Pearsoni* Schiffn. Braeriach at 3000 ft.
M. aquatica Schiffn. Up to 3000 ft. on Braeriach.
Nardia compressa Gray. Frequent in streams on Braeriach.
**N. scalaris* (Schrad.) Gray var. *distans* Carr. Braeriach at 2300 ft.

**Aplozia cordifolia* Dum. Braeriach.

Lophozia quinquedentata (Huds.) Cogn. Braeriach at 3000 ft., a curious form approaching var. *turgida*.

L. gracilis Steph. Craig Ellachie.

Sphenolobus minutus Steph. Craig Ellachie.

Lophocolea cuspidata Limpr. In the forest near Larig Ghru.

**Chiloscyphus polyanthus* Corda. Glen Eunach.

**Bazzania trilobata* Gray. Craig Ellachie.

**Chandonanthus setiformis* Lindb. var. *alpinus* Hook. Creag a Chalamain.

Anthelia julacea Dum. Frequent.

Scapania obliqua (Arn.) Schiffn. Braeriach, at 2400 ft., and Glen Eunach.

**S. uliginosa* (Swartz) Dum. Braeriach at 3200 ft.

S. purpurascens (Hook.) Tayl. Frequent, sometimes mixed with the two preceding. Some of our gatherings from Braeriach are referred by Mr. Macvicar to the *var. *inermis*.

Lichenes.

Calicium hyperellum Ach. Sterile thallus seen on several occasions. Fruit seen near Aviemore.

C. trachelinum Ach. Tree below Craig Ellachie, and in the forest near Aviemore. On an oak at the lower end of Glen Eunach. A form resembling var. *xylonellum* Nyl. in its globose fruit with inflexed margin occurs with the type near Aviemore.

C. elassosporum Nyl. On decorticated trees in the Larig Ghru. This resembles *C. melanophæum*, but has more crowded apothecia, the stipes appear to be more frequently forked at the apex, and the gonidia are enclosed in roundish syngonidia, which are often deformed by pressure. The thallus gives a dingy red reaction with KHO.

C. curtum T. & B. Sparingly on pine in Rothiemurchus Forest.

Sphærophorus coralloides Pers. Creag na Leacainn and Glen Eunach.

S. fragilis Ach. Glen Eunach.

Bæomyces rufus DC. Plentiful, occurring with the apothecia single or conglomerate on the stipes.

Icmadophila æruginosa Mudd. Abundant and fruiting freely. Especially fine in the Larig Ghru Pass.

Stereocaulon coralloides Fr. In the Larig Ghru.

Cladonia fimbriata Fr. var. *tubæformis* Fr. f. *denticulata* Del. Near Aviemore.

C. gracilis Hoffm. Near Aviemore, and at 2400 ft. on Braeriach.

C. verticillata Flörke. Creag a Chalamain, at 2500 ft., accompanied by the f. *aggregata* Del. This latter is a mere state occurring in the same tufts as the ordinary plant. One very proliferous specimen produced seventeen subsidiary cups within the primary scyphus.

C. cervicornis Schaer. Ascends to 3500 ft. on Braeriach.

C. furcata Hoffm. On Braeriach at 2400 ft. — Var. *racemosa* Mudd. Creag a Chalamain, and a spadiceous form on Braeriach at 4000 ft.

C. coccifera Schaer. Glen Eunach.—Forma *cornucopioides* Fr. On Creag a Chalamain.

C. bellidiflora Flörke. This beautiful species appears to be frequent in the district. We observed it fruiting finely in the forest near the foot of Castle Hill, on Creag a Chalamain and Creag na Leacainn, and in Glen Eunach.

C. deformis Hoffm. with forma *gonecha* Nyl. and forma *pulvinata* Nyl. Very fine in Rothiemurchus Forest.

C. digitata Hoffm. var. *denticulata* Ach. Near Aviemore.

C. macilenta Hoffm. f. *polydactyla* Mudd. Rothiemurchus Forest.

C. Floerkeana Fr. Open moorland near Aviemore.

Cladina rangiferina Nyl. var. *adusta* Rbh. At about 2800 ft. on Creag na Leacainn, in large tufts, sometimes intermixed with the next species.

C. sylvatica Nyl. Frequent.

C. uncinalis Nyl. Rothiemurchus Forest. The f. *obtusa* Nyl. occurs amongst *Thamnolia* and *Rhacomitrium lanuginosum* at nearly 4000 ft. on Braeriach.

Thamnolia vermicularis Schaer. Abundant between 3300 and 4000 ft. on the south-west side of Braeriach.

Ramalina farinacea Ach. Rothiemurchus Forest.

R. fraxinea Ach. Very luxuriant and fruiting on sycamores and some other deciduous trees between Loch Eilean and Aviemore, but not seen on birches or conifers.

R. fastigiata Ach. With the preceding, but less common.

Usnea hirta Hoffm. On pine and other trees in the forest.

U. dasypoga Nyl. var. *plicata* Nyl. On Scots pine in the forest.

Alectoria ochroleuca Nyl. Amongst *Platysma nivale* at about 3000 ft. on Creag na Leacainn. Not recognized until our return home, owing to the slender blackened apices being very inconspicuous in the field, the yellow lower portion of the thallus being hidden by the *Platysma* amongst which it was growing.

A. jubata Nyl. Abundant on conifers and birches in the forest.

A. subcana Nyl. Sparingly with the preceding.

Cetraria islandica Ach. with f. *platyna* Fr. On Creag na Leacainn at between 2500 and 3000 ft.

C. aculeata Fr. and f. *acanthella* Nyl. Frequent.

Platysma nivale Nyl. Creag na Leacainn, at 2800 ft. and upwards, plentifully.

P. fahlunense Nyl. Glen Eunach.

P. glaucum Nyl. Rocks near Loch Eunach, and on trees in the forest.

Evernia prunastri Ach. Common.

E. furfuracea Fr. Frequent. The var. *scobicina* Nyl. fruiting on old birch trees near Aviemore.

Parmelia saxatilis Ach. and f. *furfuracea* Schaer. Frequent in fruit.

P. sulcata Tayl. and var. *lævis* Nyl. Frequent on trees in the forest. The var. *rosæformis* Ach. Near Loch Eilean.

P. omphalodes Ach. In fruit on Craig Ellachie and near Loch Eunach.

P. exasperata Nyl. and *P. Subaurifera* Nyl. Trees near Aviemore.

P. fuliginosa Nyl. Near Aviemore.

P. lanata Wallr. Creag a Chalamain, Creag na Leacainn, and in Glen Eunach.

P. tristis Nyl. Frequent. With apothecia on Creag a Chalamain, and rocks near Loch Eunach.

P. physodes Ach. The type, and forms *labrosa* Ach., *tubulosa* Mudd., and *platyphylla* Ach., are all more or less frequent.

Stictina sylvatica Nyl. Sparingly on birches in the forest.

Lobarina scrobiculata Nyl. With the preceding, but more abundant.

Nephromium lusitanicum Nyl. Noticed once in small quantity on an old birch tree in the forest.

Physcia parietina De Not. Walls near Aviemore.

Gyrophora proboscoidea Ach. with forma *fimbriata* Mudd. Frequent, occurring on boulders in the forest and up to near the summits of the mountains.—Var. *deplicans* Fr. was seen on Creag na Leacainn.

G. cylindrica Ach. Common, the vars. *denticulata* Ach. and *denudata* Mudd. also being noted.

G. torrefacta Cromb. Creag a Chalamain and Creag na Leacainn.

G. hyperborea Ach. Sparingly on Creag a Chalamain.

G. polyphylla T. & B. Frequent. The forma *glabra* Nyl. on rocks near Loch Eilean and on Braeriach.

G. polyrhiza Krb. Ascends from rocks in Rothiemurchus Forest, and by Loch Eunach to near the summit of the mountains.

Lecanora elegans Ach. On a wall near Aviemore.

L. chlarona Nyl. f. *pinastri* Cromb. Rothiemurchus Forest.

L. intumescens Koerb. On an oak near Aviemore.

L. albella Ach. Trees in the Larig Ghru.

L. angulosa Ach. var. *minuta* Mass. Tree-trunks and branches in the forest.

L. varia Ach. Frequent.

L. piniperda Koerb. On Scots pine in Rothiemurchus Forest.

L. metabolioides Nyl. Trees near Aviemore.

L. polytropa Schaer. f. *subglobosa* Cromb. Craig Ellachie.

L. ventosa Ach. Creag a Chalamain.

L. tartarea Ach. Frequent and fruiting well. The forma *grandinosa* Ach. on Creag a Chalamain.

L. parella Ach. Aviemore.

L. Dicksonii Nyl. Creag na Leacainn.

Pertusaria amara Nyl., *P. communis* Nyl., and *P. leioplaca* Schaer. On trees near Aviemore.

P. dealbata Nyl. Rocks on Craig Ellachie.

Lecidea Friesii Ach. Trees in the Larig Ghru.

L. lucida Ach. Very fine on Craig Ellachie.
L. flexuosa Fries. On palings near Aviemore.
L. decolorans Flörke. Glen Eunach, and on peaty ground in the forest.
L. turgidula Fr. On Scots pine in Rothiemurchus Forest.
L. sanguinaria L. On old trees in the Larig Ghru, and in Glen Eunach.
L. parasema var. *elæochroma* Ach. Trees in the forest.—Var. *saprophila* Ach. Decorticated trees in the Larig Ghru.
L. uliginosa Schrad. Amongst heather in Glen Eunach.
L. lapicida Fr. Rocks on Braeriach.
L. contigua Fr. Near Aviemore.
L. disciformis Fr. On birch trees in the forest near Aviemore.
L. geographica L. Braeriach, but only seen in small quantity.
L. petræa Wulf. On stones near Aviemore.
Verrucaria viridula Schrad. On a stone near Aviemore.

THE GENUS *ROSA* IN 'LONDON CATALOGUE' ED. 10.

By W. Barclay.

I VENTURE to offer a few remarks in reply to the criticisms of the Revs. E. S. Marshall (p. 280) and A. Ley (p. 328) on my paper (pp. 278–80).

Mr. Ley says truly that my criticism was directed rather to his paper (Journ. Bot. 1907, pp. 200–210) than to the list in the *Catalogue*. But how could it be otherwise? The list, so far as regards the *Villosæ*, could only be understood by reference to his paper. With regard to the other principal section, the *Eu-caninæ*, it would not have been fair to criticize until the completion of Major Wolley-Dod's paper on that group.

R. involuta Sm. Mr. Marshall says that in some of the varieties of this group the second parent may be *R. Eglanteria* Linn. or *R. tomentella* Lem. The hybrid *R. spinosissima* × *R. Eglanteria* is not very difficult to distinguish, and it should not be beyond the ability of English botanists to separate it from the other varieties. But I have seen authentic specimens of nearly all the twelve varieties of the *Catalogue*, and in none of them did I see anything that could suggest *R. Eglanteria* as the second parent. As to *R. spinosissima* × *R. tomentella*, surely such a hybrid would be much more like *R. hibernica* than *R. involuta?*

R. pomifera Herrm. The ciliate petals on which Mr. Ley lays much stress seem to be of no account. Borrer, in Hooker's *British Flora*, ed. 2, p. 231, says: "In both species [i.e. *mollis* and *tomentosa*] the petals of dark-flowered vars. have not unusually a slight glandular fringe. Indeed, Fries regards such a fringe as essential to his *mollissima*, which includes the two. With us it certainly is not constant." Again, Mr. Baker (Mon. p. 212) says of *R. mollis* Sm.: "Corolla . . . sometimes gland-

ciliated"; and on p. 215 he refers to a Thirsk plant in which "the corolla is beautifully gland-ciliated." Ciliate petals therefore occur both in *R. mollis* and *R. pomifera*, and cannot be relied on to distinguish the one from the other.

R. mollis var. *recondita* Pug. Mr. Ley's contention is that this rose, which is very widely spread in Switzerland, occurs also in Britain, and that continental botanists have wrongly described it as a variety of *R. pomifera*, whereas it is really a var. of *R. mollis*. It is hardly likely that these continental botanists, many of them rhodologists of the first rank, could have gone so far astray, more especially as they universally describe it as the variety nearest the type of Herrmann. But an interchange of fresh specimens has enabled me to recognize what Mr. Ley's var. *recondita* really is. It is simply the large-fruited form of *R. mollis*, which we in this part of the country [Perthshire] have looked upon as the type of that species. True, it has numerous small subfoliar glands, and if it is to be considered on that account as a variety and not as the type, I do not object; but it certainly is the form which is nearest to the type of Smith. Mr. Ley's discovery therefore amounts to this, that *R. pomifera* Herrm. and *R. mollis* Sm., as regards the chief variety of each, cannot be separated. Surely the logical conclusion from this is what Crépin maintained so strongly and reiterated again and again, *viz.* that these two pretended species are in reality one, and that the characters relied on to separate them—the colour, shape and size of the leaves, the spiny fruit—are merely superficial and very variable, and at the most can only separate them as varieties and not as species. Mr. Baker, too, seems to have been substantially of the same mind, for he joins to *R. mollis* as synonyms var. *recondita* Pug. and var. *Grenierii* Déségl., the latter a small-leaved and small-fruited var. of *R. pomifera*, which, if it occurred in Britain, would certainly be set down as a var. of *R. mollis*. It is extremely likely, I think, that Mr. Ley's *R. pomifera* Herrm., with ciliated petals but differing from the garden form, will turn out to be a discovery of the same kind as his discovery of var. *recondita* Pug.

R. omissa Déségl. There can be no doubt that, in Scotland at least, we have forms of *R. tomentosa* Sm. on which the sepals persist till the fruit is fully mature. These may be considered as belonging to the same group as *R. omissa* Déségl. and its var. *resinosoides* Crép., but, in view of Crépin's latest opinion, it would be wise to wait for further light before finally deciding that any of our forms are identical with the foreign species and its variety.

R. suberecta Ley. As regards this form, my question was, How could Mr. Ley identify this species with *R. suberecta* Woods, described by Woods and Mr. Baker as a form of *R. mollis* Sm.? To that question Mr. Ley makes no answer. My remark that Mr. Ley's species seemed to embrace more forms than one was suggested partly by the terms of his diagnosis, and also because I could see no real difference, so far as his descriptions go, between his *R. suberecta* and his *R. Andrezeiovii*, and very little between his *suberecta* and his *Sherardi* Davies.

I am well aware that it is much easier to criticize than to construct, and it must not be supposed that I do not consider Mr. Ley's paper as of very considerable merit in many points; it will certainly do not a little to help forward a better understanding of our native roses.

WEST GLOUCESTERSHIRE PLANTS.

By Ida M. Roper.

Eriophorum latifolium Hoppe. Among the southernmost spurs of the Cotswolds there are deeply excavated combes and valleys with small streams running towards the Severn from the high plateau of oolite that lies to the eastward. One of these, known as Whitewell Bottom, has its mouth at Hillesley, and winds its way upwards, with long stretches of woodland upon its sides. Whilst exploring a part of this, where the Bottom is filled with woods, my brother and I came on a piece of open swamp about an acre in extent, on the south side of the stream, where this plant was growing in abundance with *Carex eu-flava*, *C. Hornschuchiana*, and *C. xanthocarpa*. A small isolated patch was seen also about a little spring-head on the other side of the combe. The place is so thickly screened by brushwood and a huge growth of *Equisetum maximum* that nothing can be seen a few yards away.

Eriophorum polystachion L. Messrs. Bucknall and White, who went to Whitewell Bottom shortly after our visit, kindly allow me to report that they detected this commoner plant growing very sparingly with the rarer one. Mr. Bucknall has a specimen. Hewett C. Watson's enquiry in Top. Bot. "Is 34, West Gloucester, a real exception to comital generality?" can now be answered in the negative.

Euphorbia Cyparissias L. According to Dunn, the only natural locality hitherto known for this spurge in Britain is on the downs near Dover. The discovery of a native station in the West of England is, therefore, a matter of some interest. We found it on a hillside sloping steeply to the wooded bottom of the valley within a mile from the swamp in which the cotton grasses grow, on the north side, at an elevation of four hundred feet. The top of the combe and spring-head lie about one hundred feet higher, at a distance of less than two miles. There is in this valley no building other than a cowshed, until some mills are reached considerably lower down. No footpath lies near—the road up the combe is on the opposite side—nor has there been planting or cultivation of any kind to suggest the idea of possible introduction. The Euphorbia, so far as we know at present, is confined to a spot which was woodland at no distant date, and would speedily relapse into wood again if it were left ungrazed by cattle. It covers an area about twenty yards in diameter, having in the centre a large hazel, some small hawthorns, seedling oaks

and dog-roses. Sheltered among these the plant grows luxuriantly two feet or more high. Smaller ones extend outwards all around into the bare turf, mingling with such species as *Anthyllis*, *Hypericum*, *Origanum*, *Gymnadenia*, and *Carduus acaulis*. Seven miles from a railway station, and much farther from a town of any size, it would be difficult to find a wilder and more unfrequented spot than that in which these plants have so long remained concealed.

TWO LINCOLNSHIRE PLANTS.

No satisfactory explanation has as yet been given why *Limonium bellidifolium* Dum. has disappeared from the estuarine alluvium on the Wash in South and North Lincolnshire while it still remains in Norfolk, in both the east and west Watsonian vice-counties, on the same estuary. Mr. A. Bennett says (Trans. Norf. and Norwich Nat. Soc. viii. 235): "The Norfolk stations must be as old as the Lincoln, yet it there maintains its ground." They are far older and less fluctuating, and that is the whole secret. At Leverton in North Lincolnshire, and at Fosdyke in South Lincolnshire where Sir Joseph Banks formerly found it, the seashore of 1790 is far inland, with new inclosures of various dates lying between it and the present foreshore. This is also the case at Frieston (*Banks* sp.), where it was formerly found with us. The point to notice is that at all these places the conditions at times have changed suddenly and as violently. Inclosures of fresh silt have been made time after time, and unless there was *one spot* left from which the species could spread years after these recurring destructions, the case of *L. bellidifolium* would be hopeless in Lincolnshire, and the species would naturally be extirpated by agriculture. "It grows," says Sir Joseph Banks (Bot. Guide, 388), "in the level grassy land where the sheep bite close" on the foreshore. But after a new inclosure this land is either ploughed up at once, or harrowed heavily as a preparation for grass and clover seed for meadowing the salt out of the silt. In either case it means simple destruction to a plant which can only flourish in a short, compact, if rich soil herbage. After an inclosure, too, there is no place for this species on the new foreshore, even if it were possessed of special means for reaching the new locality. Estuarine sand is rapidly cast up against the new bank by its action on the cross currents of the estuary; but years of *Salicornia*, *Atriplex portulacoides*, and later combinations of growths on the foreshore have to act as a silt-sieve on the turbid waters of the estuary to prepare for *L. bellidifolium* a fitting home ere it can come to stay. This even is not all. Sheep, or other closely biting stock, must come and lend their aid to advancing the proper conditions, or they will never be what are required. These analyses are the romances of the rock-soil method. The drift maps of the Wash conclusively show that the inclosures on the Lincolnshire side have been far more extensive than any made

on the Norfolk shore, where this species still holds its ground under less fluctuating conditions.

If we ever meet with it again in Lincolnshire, I fear it will have to be considered a natural colonist from the other side of the Wash. This is where we must class *Cochlearia danica*, which has been sought for fifty years without result on the best worked ground in Lincolnshire, and has at last turned up in a natural locality on marine sand this season; I have specimens from Skegness collected by Mr. Bernard Reynolds. In conclusion, I can only hope that no lover of plants will sow *L. bellidifolium*, for such purposely made introductions are the utter confusion of scientific soil studies.

E. A. Woodruffe-Peacock.

The discovery of *Cochlearia danica* for the first time in Lincolnshire having aroused some interest, I append a few notes. Visiting Skegness on May 19th, 1907, I walked along the sands south of the pier, and on reaching the end of the Seacroft golf-links turned inland through a dense tangle of *Hippophaë Rhamnoides* together with *Prunus spinosa* and *Cratægus Oxyacantha*, a veritable "thorny thicket," I at once noticed *C. danica* growing in several spots rather freely together with quantities of *Valerianella olitoria* over at least two acres of ground. The plant seemed rather more dwarf than that which I had found previously on the shingly beach at Shoreham, Sussex, due probably to the dense overgowth. During a long visit to Skegness this summer I made a list of over five hundred plants, and not coming across *C. danica*, I made a special search again for it at the place I had seen it the previous year. After some difficulty I succeeded in finding a few seeding specimens, but it was August, and most of the plants had disappeared. It has been suggested that the plant has only recently appeared there as an introduction, but I am more inclined to think it has been overlooked, notwithstanding the fact that the district has been very closely scrutinized for many years. The spot is very remote, and, being quite fifty yards inside the sandhills and a hundred from high-water mark, the theory of the seeds having been washed ashore seems to me untenable, nor does the scattered occurrence of the plant suggest a recent establishment.

Bernard Reynolds.

RICHARD VERCOE TELLAM.

Richard Vercoe Tellam was born at Tregustick, in Withiel parish, Cornwall, on Feb. 9th, 1826, and died at Wadebridge on Sept. 18th. With such enthusiasts as Ralfs, James Cunnack, William Curnow, and T. R. Archer Briggs, all of whom had long predeceased him, Mr. Tellam did no end of useful field work, and it may be questioned whether there is a single parish in the county which he had not visited. This thoroughness of method

and thirst for knowledge he retained to within a short time of his death. In the summer of 1907 it was my great privilege to take several walks with him in the neighbourhood of Falmouth, as well as near Wadebridge and Padstow. Although his memory was not then as responsive as formerly, his love for nature and his intimate acquaintance with much which may rightly be characterized as critical, was as keen as when I first met him nearly fifteen years ago. On one of these rambles near Falmouth he showed me a *Hieracium* which appeared to be new to him, and which Messrs. Linton subsequently referred to *H. serratifrons* Almq. This was an addition to the flora of Southern England.

In the popular acceptation of the term, Tellam was not a scientist; rather was he a devout nature-lover and an enthusiastic collector; and I feel sure this is what he would have labelled himself if asked to do so. Physiological botany was to him almost a sealed book. Geological, morphological, and to a great extent geographical, botany absorbed but little of his time. Evolution and "such like new-fangled notions," as he was wont to call them, called forth not one iota of his sympathy; but when it came to fine distinctions between species and varieties, to local assemblages of plants and the prime factors in directing them, you could not get away from the feeling that you were in the company of a master. Yet his views were uttered in simple everyday phrase, and with almost painful modesty, and to me, at any rate, it was apparent that here was one who went to nature not so much for what he might be able to announce as being new, as for what he might learn from her. He possessed in the fullest manner possible Gilbert White's faculty for detail, and this his occupation—that of a farmer—enabled him to cultivate. He had a splendid, perhaps a unique, knowledge of the algæ, fungi, lichens, and mosses of Cornwall; his contributions to our list of phanerogams are more numerous than those of any other student; he became also a collector of local insects. About thirty years ago, owing to heart trouble, he gave up farming, and thenceforth natural history and his work as a Wesleyan Methodist lay preacher divided his attention. His botanical collections have been given to the Royal Institution of Cornwall to be placed in the Museum at Truro.

Tellam was not a writer, otherwise literature would have been enriched by his store of knowledge; nor was he even an extensive note-maker, a still more regrettable fact. A stray list or two in the reports of West Country natural history societies, some records in Keys' *Flora of Devon and Cornwall*, in Ralfs' *MS. Flora of West Cornwall*, and in W. & G. S. West's papers on freshwater algæ are practically all that stand to his credit. When, however, my Cornish Flora is published his name will occur on almost every page of that work. The phanerogams which he added to the list of Cornish plants are:—*Ranunculus Drouetii*, *R. tripartitus*, *Callitriche obtusangula*, *Hieracium serratifrons*, *Mentha alopecuroides*, *Lamium maculatum*, *Elodea canadensis*, *Potamogeton crispus*, *Glyceria Borreri*, *Hordeum nodosum*, *Carex curta*, *C. pallescens*, *Chara*

vulgaris. In cryptogamic work, more particularly in mosses and freshwater and marine algæ, he was even more successful, his additions to the county lists running to great length.

F. Hamilton Davey.

Mr. Tellam was sent to a boarding-school at Wadebridge at the age of twelve, and after two years' tuition came home to work on the farm at Withiel, where he showed his natural ability in farming with success. His taste for botany appears to have been due to the acquaintance he made of a tutor who taught the sons of the clergyman at Withiel, and who took great interest in botany. But Tellam did not allow his hobby to interfere with the business of life, although he rarely returned home without some plant or natural history specimen, whether flowering plant, moss, lichen, scalemoss, or alga, or perchance a moth or butterfly.

I first had the pleasure of making his acquaintance about 1866. He contributed towards the lists of mosses, scalemosses, and lichens of Devon and Cornwall, published by myself and M. T. Brent in the *Transactions* of the Plymouth Literary and Scientific Institution in 1872, vol. iii., as well as to the *Flora of Devon and Cornwall*, published at Plymouth by J. W. N. Keys in 1866. But he thought that Cornwall should have lists of its own, and in 1884 published a full list of the lichens of East Cornwall, and in 1887–8 a list of the mosses, in the *Transactions* of the Penzance Natural History and Antiquarian Society (vol. ii. pp. 73, 379), following a list of the lichens of West Cornwall by Dr. Ralfs. In fact, Tellam as thoroughly explored East Cornwall as W. Curnow and Ralfs did the western portion of the county. Probably no one knew more about the botany of East Cornwall, whether cryptogamic or phanerogamic, than he; mosses and scalemosses, freshwater and marine algæ, all were attacked in turn. Marine algæ he was at length obliged to give up when he could not work without spectacles, since the salt spray and rain prevented his seeing the plants *in situ*. He found several new British seaweeds—e. g. *Grateloupia dichotoma* was first found by him at the Rennie Rocks, near Plymouth, although he only recognized it as something new to him; *Monostroma Withockii* and *M. laceratum* at Plymouth and Wadebridge respectively, as well as several others. Living far from any scientific institution where modern scientific botanical works could be borrowed, he worked at a disadvantage, and, being naturally thrifty, to which fact he probably partly owed his success in farming, he denied himself the luxury of buying expensive books on scientific subjects, preferring rather to do good by stealth with such money as he could spare. Had this not been the case he would have been able to contribute much more matter than he did to current botanical literature. By the Falmouth Polytechnic Institution, Tellam was awarded a first silver medal for two volumes of British seaweeds, which are now in the Bodmin Museum; another for a collection of mosses; a third for nine volumes containing wild flowers, grasses, and ferns, now in the Truro Museum; and a first bronze medal for a book of Cornish seaweeds; and he

was much pleased with this local recognition of his scientific work. His name is perpetuated in the genus *Tellamia*, a curious alga found growing in the skin-like integument or periostracum of a univalve mollusk, and described by Batters in the *Annals of Botany*, ix. 168, pl. xi. figs. 18–24.

Tellam was a man of keen observation, shrewd judgement, and genial disposition, and was liked and respected by all who knew him. He belonged to the small and decreasing band of botanists who pay attention to all branches of field botany, and few British botanists possess the wide all-round knowledge of cryptogams that he acquired—a knowledge possessed by no other British farmer, except the late W. Curnow, that I have ever come across. For the details of his early life I am indebted to the kindness of Mrs. Tellam.

E. M. Holmes.

SHORT NOTES.

Orchis hircina in Sussex.—In *The Entomologist* for 1907, p. 300, it is stated that "blooms of the Lizard Orchis found in Surrey" were exhibited by Dr. G. G. C. Hodgson at a meeting of the City of London Entomological Society on Oct. 1st. Dr. G. Hodgson, who has made a close study of all the British *Orchideæ*, and has drawn and photographed nearly all the species, tells me that this should be Sussex, where it was found in the western part of the county in July, 1907. I was shown, too, one of its flowers preserved in spirits, and photographs of the freshly-gathered plant which now rests, in a dried condition, in the herbarium of Mr. A. O. Hume. As this occurrence is of great interest, it may not be out of place here to review all the known county records as far as I can ascertain for this rare and dis-appearing British plant. 15. *Kent East.* About ten stations on record (see Fl. Kent, 328). First notice, Manston Wood, R. E. Hunter, *Short Account of Thanet*, 1796. Last notice, Shepherds-well, 1885, J. Jacob, to present year. Near Wye (see Journ. Bot. 1899, 278), 1899, to present year. 16. *Kent West.* About nine stations on record (see Fl. Kent, 328). First notice for Britain, "Nigh the highway betweene Crayford and Dartford," Johns. Merc. Bot. pars alt. p. 27 (1641); it was collected at Dartford by Banks and the figures in Eng. Bot. and in *Fl. Londinensis* are from Dartford specimens. Last notice, Darenth Wood, G. B. Wollaston (? date), and quarry at Greenhithe, E. J. Cox, 1878–9. 17. *Surrey.* One station? Boxhill, Mr. Graves in Curt. Fl. Lond. ed. 4 (1821). Recorded from near East Horsley by J. M. Higgins in *Science Gossip*, 1878, but requires confirming. 25. *Suffolk East.* One station. Great Glemham, Rev. E. N. Bloomfield, 1847. Not found since. The specimen passed into the possession of C. C. Babington; a single flower from it was sent to the National Herbarium by Mr. Bloomfield in 1891.—C. E. Salmon.

[It may be worth while to call attention to the Kentish records for the plant cited in Journ. Bot. 1884, 54, from G. M. Arnold's

biography of Robert Pocock, as these are not all taken up in the *Flora of Kent*. We have in the National Herbarium flowers and a leaf from Pocock's Herbarium.—Ed. Journ. Bot.]

Sedum pallidum Bieb.—This plant grows as a weed over about an acre of land in the Pittdown Nurseries, near Maresfield, in Sussex. Mr. Dennett found it there when he took the nurseries sixteen years ago. Though it is hoed up, it sows itself persistently and abundantly every year. There is no record of how the plant was introduced.—A. D. Ryder.

Vicia hybrida L.—In 1907, and again this year, a friend sent me specimens of this plant gathered on the downs between Dover and Deal. The station is on an unfrequented part of the downs, far removed from any house, road, or footpath. The plant is found for a considerable distance. I forwarded specimens to Mr. A. Bennett, together with a bundle of the plants with which it grows, and he replied that it certainly had the look of a wild plant, and that the specimens (some twenty) of its associates were a strong argument in favour of the *V. hybrida* being a native.—S. H. Bickham.

Warwickshire Botany.—I have recently received from Mr. Bolton King an account of the botanical work the village children have been doing in various portions of Warwickshire in which he lives or is interested. Mr. King, as will be well known, has been a lover of botany from his early school-days and his college days at Oxford, and for some years he has been encouraging the school-boys and girls in several of the Warwickshire villages to interest themselves in botanical studies. Some of them have been going over some of my old hunting ground and turning up things I have not found or recorded from the localities they have investigated. For instance, the Wilmcote children have found *Astrantia major* well established in woods near their village; the Birchingbury children have found *Salvia pratensis* in one of the woods near their village; and the Atherstone children have found *Osmunda regalis* at Ansley. All of them have thus gained an interest in nature study, the results of which can hardly fail to be beneficial to them in after life.—J. E. Bagnall.

Rosa obovata Ley (*R. tomentosa* var. *obovata* Baker) (p. 329).—Having observed Crépin's remark that this belonged undoubtedly to the *coriifolia* group, I looked it up at Kew, in order to introduce it into my paper, but the only specimen I saw (collected by Mr. Baker) appeared to my judgement to be quite a *tomentosa* and not a *coriifolia*, so I passed it by.—A. H. Wolley-Dod.

Worcestershire Hybrids.—The following hybrids, which do not appear to have been recorded for Britain, have occurred near Malvern:—*Viola canina* × *sylvestris*. Malvern Link, *Mr. W. J. Rendall*. One plant only noticed. Where this grew the hybrid *V. canina* × *Riviniana* was abundant. The former plant is, however, not likely to be often produced, as *sylvestris* flowers so much earlier than *canina*, and only a late flowering specimen could effect a cross.—*Galium erectum* × *verum*. Malvern Wells,

Mr. W. J. Rendall. Here, again, owing to the difference of the flowering time of these species, I imagine that the hybrid will only rarely be met with; probably in this case fertilization was effected with a plant of *erectum* that had been cut with the grass and again flowered, as is often the case with this species.—*Taraxacum officinale* × *Crepis taraxacifolia.* Malvern Wells. This bigeneric hybrid I met with on July 9th. The plant had the leaves of the *Crepis* but bore two *Taraxacum* scapes, which were then in fruit. Mr. Rendall, who is very successful in rearing plants from hybrid seed, hoped that some of the fruits might contain fertile seeds, and kindly undertook to try and grow them, but none have germinated. I am watching the plant, which appears to have inherited the perennial character of *Taraxacum*, and I hope next year to obtain good specimens in flower.—RICHARD F. TOWNDROW.

HYDRODICTYON RETICULATUM Lagerh.—In August we found an abundance of this plant in the river Idle, in North Nottinghamshire, in the parish of Everton.—E. & H. DRABBLE.

NOTICES OF BOOKS.

The Royal Botanic Gardens, Kew, Historical and Descriptive. By W. J. BEAN, Assistant Curator. With an Introduction by Sir WILLIAM THISELTON-DYER, K.C.M.G., &c., and 20 Reproductions in Colour from Paintings by H. A. OLIVIER, and 40 Half-Tone Plates from Photographs by E. J. WALLIS. 4to cl. pp. xx, 222. Price 20s. Cassell & Co.

IN these days, when coloured pictures often form a more important feature in a book than the text which they are supposed to illustrate, it would have been easy to produce a volume on Kew Gardens in which the text should occupy a secondary place. This however is by no means the case with the very handsome volume which Messrs. Cassell have recently issued. The illustrations are indeed, as they should be, attractive, but they are not overdone; and the book in no way depends upon them for an interest which it would possess if pictures were entirely wanting.

Mr. Bean has given us an extremely complete account of an institution which, as a Prime Minister remarked to the late Director with somewhat faint praise, we "need not be ashamed of." He begins with the origin and development of the Royal Gardens, from their early history to the present day, with biographical sketches of the principal folk who have taken part in their administration; a section is then devoted to English landscape-gardening at Kew, followed by one on its scientific aspect; then he takes us through the palm-house and the greenhouses, whence we pass out of doors to the arboretum and pinetum to the gardens and rockery, with its adjunct the "alpine house." He has conveyed his information, the acquirement of which must have involved much varied reading, in a pleasant style in which brevity never leads to dulness; the book in fact is eminently

readable. The sketch of the early history of the Gardens is particularly well done; the frequent citation of dates—too often neglected in books of this kind—renders it easy to follow the chronology of the history. Moreover it is extremely accurate; we note only one statement which is open to question—that in which Aiton is spoken of as "the first botanical director of Kew and author of *Hortus Kewensis*." Aiton's botanical knowledge was but slight, and the *Hortus Kewensis* is well known to owe its scientific value to the very great assistance rendered in its compilation by Solander and Dryander. We think, also, that Mr. Bean attaches too much importance to the value of the "Kew Hand Lists" as affording a standard of nomenclature; and the view that "it is not so important what name is used as that it shall be generally used" is dangerously akin to that "plea of convenience" which has done so much to render difficult the establishment of nomenclature on a logical and rational basis. But this is a small matter which does not in the least affect the general excellence of the book.

The coloured illustrations, to which we have already referred, are excellent specimens of colour-printing, and the half-tone plates from photographs are equally well chosen and satisfactory. The typography and arrangement are excellent and the binding is handsome. In a word, the book is entirely satisfactory, both in matter and manner, and will doubtless obtain the wide success which it deserves.

Chemie der Höheren Pilze. Eine Monographie von Dr. Julius Zellner. Leipzig: Wilhelm Engelmann. 1907. Pp. iv. & 257. Price 9 marks.

The author of this work puts in no claim for completeness in the presentation of his subject: he offers it rather as a basis for future work, and as such it will be found extremely valuable. Fungi are all either parasitic or saprophytic, drawing nourishment from many different substrata, and they reflect this varied nutriment in the character of the chemical constituents which have been isolated from them, and which differ widely from those of chlorophyll-containing plants, approximating more nearly to animal substances. These somewhat striking biochemical phenomena have always attracted students, but the older records are often only of historical value; they are cited here in the order of publication, while the more recent work is arranged according to subject, including numeral and organic substances, colours, poisons, &c. Finally, the author sums up shortly the points in which fungi differ from other plants; they possess no true cellulose, the cell-membrane being of a chitinous nature; chlorophyll and starch are both wanting, but carbohydrate in the form of glycogen is widely distributed; fats are present as fatty acids; basic bodies such as muscarin, ergotinin, &c., are abundant, but no true alkaloid has been detected; colour substances and various ferments peculiar to fungi are also very frequent.

Dr. Zellner compares the chemistry of fungi with that of the

nearly-related groups of algæ and lichens, and concludes that our present knowledge gives no clue to affinity on that line; this is easily understood in the case of algæ which possess chlorophyll and are adapted mostly to the aquatic habit, but the difference is equally great and more surprising between fungi and lichens. These latter are biochemically an entirely independent group of plants, their cell-products being unlike those of all other members of the vegetable kingdom. The correspondence between animal and fungal cell-products has already been commented on. Dr. Zellner considers that this may be of systematic and biological importance, but suggests that the condition may be shared by parasites and saprophytes belonging to the higher plants; there is no record of research on this question.

A high nutritive value has long been claimed for fungi, and mushrooms with other edible forms have been considered a valuable source of proteid food-supply. The examination of results obtained by many workers goes to prove that they have been overrated as such; much of the nitrogen they undoubtedly contain is combined with other substances than proteids and not available for nourishment, and the proteids themselves are difficult of digestion. Poisons are present as bases and toxins. Only a few groups have as yet been worked out, and a large and unoccupied field of research is waiting for the student. The book is well indexed and is provided with a number of tables setting forth in comparative form the results of the chemical examination of the different species. The author has earned the gratitude of all who appreciate painstaking and thorough work.

A. L. S.

BOOK-NOTES, NEWS, &c.

All who are interested in galls and other growths in plants and trees caused by insects and mites will welcome Dr. C. Houard's handsome volume—the first of two—*Les Zoocécidies des Plantes d'Europe et du Bassin de la Mediterranée* (Paris, Libraire Hermann; subscription price for the two volumes, 40 francs). The host-plants are arranged in botanical sequence, beginning with the cryptogams and extending through gymnosperms and monocotyledons to part of the dicotyledons. Each order is prefaced by an introduction dealing generally with the various excrescences and the insects that cause them; then follows a list of the plants with a full description of the malformations in the form of a clavis and the names of the insects which cause them, and a bibliography. The volume is illustrated with more than eight hundred excellent figures, and extends to over five hundred pages, thus combining cheapness with excellence.

The September number of the *Icones Plantarum* is entirely devoted to new species of *Impatiens* described by Sir Joseph Hooker. It must surely be a unique occurrence that such a piece of work as this should be undertaken by a botanist who has passed his ninetieth year, and we congratulate Sir Joseph on its successful accomplishment.

The Thirteenth Annual Report of the Moss Exchange Club (York: Coultas and Volans, April, 1908, pp. 267–294) contains several pages of records of mosses and hepatics, often with appended notes descriptive or critical. Descriptions of five species new to the British Islands (one of them new to science) are appended, being translated into English from various sources. A form of *Grimmia subsquarrosa* found in Pembrokeshire has elicited from Mr. H. N. Dixon some comments upon the mutual relationships of that species with *G. Lisæ* and *G. trichophylla*: his views as to the subordination to the last species of the two former and certain other species might well be expanded into a separate paper and published for the benefit of bryologists generally.

Messrs. Jack, of Edinburgh, send us the first parts of what will evidently be a handsome and attractive work, entitled *Beautiful Flowers and how to Grow them*. The practical part is undertaken by Messrs. Horace J. and Walter P. Wright; the plates, of which there are to be a hundred, are by well-known artists, and, judging from those in these two parts, will "delight at once the gardener and the artist." The Rose is the subject of the first number, and the plates indicate the treatment of its various forms in different horticultural aspects. The frontispiece is a charming study in the Chinese manner by Miss Eleanor Fortescue Brickdale, whose sympathetic and accurate treatment of flowers will be familiar to the too few who are acquainted with her interesting pictures; to the second number she contributes a study of Anemones which is a beautiful example of colour-printing. The work, which both in printing, paper, and plates is entirely satisfactory, will be completed in seventeen parts at 1*s*. (net) each.

The list of the alien plants of the Warrington district by Mr. G. A. Dunlop, published in July in the Memoirs of the Manchester Literary and Philosophical Society differs from many of such lists by the presence of interesting notes on the plants and the circumstances of their occurrence, and also in the inclusion of many which are undoubtedly native in many parts of the country, though here introduced. Among these it is curious to find *Ranunculus Flammula*, *Silene latifolia* ("becoming very common in the district") *Euonymus*, *Anthemis nobilis*, *Carlina vulgaris*, *Echium vulgare* and others whose character is usually equally above suspicion, but which in this district are associated with railway stations and embankments. One or two of the plants included—e.g. *Lathyrus sylvestris* and *Dipsacus sylvestris*—are described as "native," and so seem out of place on the list; others are both native and alien, such as Broom, which is wild on the Frodsham hills but also grows on railway banks as an introduction. *Kalmia angustifolia*, which finds place neither in Mr. Dunn's book nor in Mr. Druce's list, has been established on Rixton Moss for many years.

We have received the *Report of the Watson Botanical Exchange Club* for 1907–8, from which, as well as from that of the *Botanical Exchange Club*, we hope to give some extracts when space permits.

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BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

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The Journal of Botany was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

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THE EUROPEAN VARIETIES OF *CAREX CANESCENS*.

By Frederic N. Williams, F.L.S.

The earliest notice of *Carex canescens* is by Ray, Cat. Plant. Angl. 146 (ed. 1, 1670), 143 (ed. 2, 1677):—"Gramen cyperoides elegans spica composita. *Elegant Cyperus-grass, with a compound Spike.* Radices huic albæ fibrosæ; folia angusta & vix ¼ digiti lata, carinata, pallide viridia, caulem aliquousque amplectentia, dodrantem longa. Caulis pedalis, triquetrus, nudus, in cacumine spicam gestat herbaceam seu ex viridi flavicantem et non spadiceam e spicis parvis 5 vel 6, vel pluribus paucioribusve compositam brevibus, rotundis, squamosis, squamis compressis et acuminatis. Ad spicam nullum apponitur folium.—In a pool in a grove not far from Middleton, towards Coleshill in Warwickshire; also near Wrexham in Denbighshire, and doubtless in many other places." There is also a shortened description of the plant in Syn. Meth. Stirp. Brit. 268 (ed. 2, 1696). An examination of the specimens in Herb. Linn., together with the comparison of description, synonymy, and habitat as given by Linnæus, show that the application of the name *canescens* in the Linnean sense to the British plant is in no way feasible, and would only cause confusion. I quite agree with Mr. E. S. Marshall (see Journ. Bot. 1907, 365), after an independent review of the conflicting claims, that *C. divulsa* has far better claims to be reckoned as *C. canescens* L. than has *C. curta* Good. (i. e., *C. cinerea* Poll.); and I think that all doubt is cleared away by citing Lightfoot as the authority. In the Linnean Library copy of *Fl. Scotica*, where Lightfoot gives an excellent description of the British plant, there is a marginal note in pencil in Smith's handwriting that the specimens in Lightfoot's herbarium were gathered in ditches by Loch Leven (? Inverness-shire). These specimens are probably in the Museum at Saffron Walden, as they are not in Herb. Kew.

Carex canescens Lightfoot, Fl. Scotica, 550 (1777); ?? L. Sp. Plant. 974.

Var. α = curta Good. in Trans. Linn. Soc. ii. 145 (1794).

f. typica (brevifolia).

f. longifolia.

Var. β tenuis Lang, in Linnæa, xxiv. 538 (1851).

f. longibracteata Asch. & Graebn. Syn. Mitteleur. Fl. ii. 2, 61 (1902).

Var. γ lætevirens Asch. Fl. Brandenb. i. 770 (1864).

Var. δ subloliacea Læstad. in Hartman, Skand. Fl. ed. 4, 299 (1843).

Var. ε fallax Asch. & Graebn. *l. c.*

The following description has been drawn up from a series of Scottish, Norwegian, and Prussian specimens. In order to emphasize differential details, all group-characters, including those of the subsection have been carefully eliminated.

Ser. *Homostachyæ*, sect. *Hyparrhenæ*, subsect. *Canescentes*

Andersson, Cyperaceæ Scandinaviæ, 56 (1849). C. CANESCENS *Lightfoot*, Fl. Scotica, 550 (1777); *Koch*, Syn. Fl. Germ. Helv. ed. 2, 870 (1844); *Gren. et Godr.* Fl. de France, iii. 398 (1856); *Blytt*, Norges Fl. ed. 1, 201 (1861); ed. 2, 141 (1903); *Richter*, Pl. Europææ, i. 151 (1890); *Asch. & Graebn.* Syn. Mitteleur. Fl. ii. 2, 60 (1902); *Koch*, Syn. Deutsch. Schweiz. Fl. aufl. 3, 2601 (1906).

Radix fibrosa, fibris albidis sat ramosis. Rhizoma dense cæspitosum, stolonibus carens. Culmi stricti, triquetri, angulis inæqualiter obtusis, læves, apice ad angulos scabri, ad basin vaginis recurvis vel oblique divergentibus clare brunneis marcescentibus vestiti, imis abbreviatis, reliquis elongatis. Folia 2-3 mm. lata, erecta subrigida elongato-linearia supra plana subtus leviter carinata canescenti-glauca rarius læte virentia in apicem longum tenuem attenuata, inferne lutescenti-membranacea margine lævia, ceterum margine scabrido-asperula, culmo breviora vel interdum subæquilonga rarius quidem, longiora, nervis sæpius 15. Spica 1–5 cm., composita. Spiculæ plerumque 4–6, interdum plures, 8–14 florum, 4-10 mm. longæ, aspectu albido-canescentes; in anthesi ellipsoideæ vel ovoideæ, sessiles simplices remotiusculæ, superiores paullum approximatæ, acutatæ 1 mm. crassæ; in fructu ovoideæ, 2–3½ mm. crassæ; densifloræ etiam plerumque multifloræ; spicula infima haud bracteata. Glumæ late ovatæ, subacutæ acutæ mucronatæ vel in apiculum tenuem productæ, stramineo-albidæ lutescentes vel rarius lutescenti-bruneolæ, dorso viridi-vittatæ, margine late albescenti-hyalinæ; fructu breviores. Utriculus 2 mm. × ¾–1 mm., membranaceus olivinus demum lutescenti-bruneolus, sat ovoideus vel anguste ovoideus, in rostrum emarginatum brevissimum scabrido-marginatum sensim attenuatus, basi breviter contractus. Cellulæ epidermales partis saccatæ etiam rostri parte inferiore extus incrassatæ et papillosæ. Nux olivina ovalis subtiliter striata. Stylus haud mox deciduus.

Var. α = CURTA *Good.* in Trans. Linn. Soc. ii. 145 (1794) — forma speciei typica; *Pers.* Syn. Plant. ii. 539 (1807); *Kunth*, Enum. Plant. ii. 403 (1837); *Bertol.* Fl. Italica, x. 54 (1854); *Bab.* Man. Brit. Bot. ed. 6, 381 (1867); *Syme*, Engl. Bot. ed. 3, x. 101 (1870).

Rhizoma stolonibus carens. Culmi plerumque 25-40 cm. Folia canescenti-glauca, culmo breviora vel rarius subæquilonga. Spiculæ 5–6, interdum plures, plerumque multifloræ, in fructu ovoideæ; spicula infima haud bracteata. Glumæ stramineo-albidæ.

Hab. Fens, bogs, swamps, marshes, and moorland pools; in all the countries of Europe except Spain, Portugal, Roumania, Montenegro, Turkey, Greece, Crete, and Cyprus. It reaches its southern limit in Calabria, —"nasce ne' boschi di Calabria" (Tenore, Fl. Napolitana, v. 246 [1837]). Of the English counties it has been recorded in all except the following twelve:—London, Middlesex, Essex, Hertfordshire, Buckinghamshire, Huntingdonshire, Northamptonshire, Nottinghamshire, Herefordshire, Pembrokeshire, Montgomeryshire, and the Isle of Man.

I cannot separate from the type the form *robustior* of some Norwegian and Scottish plant-lists. In the former case it seems

to be founded on specimens of "*Carex canescens* var. *robusta*" collected by Blytt, of which there are small and immature examples in Herb. Kew. and Herb. Mus. Brit., much more similar to the common form than Andersson's bald description would seem to imply. In the other case the expression "*robustior*" can by no means be reasonably applied to the alpine form of the Scottish Highlands described by Syme, and incorrectly called *C. curta* var. *alpicola* Wahlenb., a continental plant now considered a distinct species under the name of *C. brunnescens* Poiret. Syme says that the mountain-plant is smaller and *more slender* than the type, with few-flowered spikelets. Rev. E. S. Marshall, in 1897, sent a series of these alpine specimens to Rev. G. Kükenthal, who named them var. *robustior*. But the distinguished caricologist seems to have changed his opinion about them afterwards, as three years later, in Engler's *Jahrbuch*, xxvii. 509 (1900), Herr Kükenthal includes the same specimens under var. *fallax*. Mr. Marshall's contention, therefore, in Journ. Bot. 1898, 75, is not maintained; and it is only necessary to compare the specimens collected by him on Ben More of Assynt in Sutherland (in Herb. Mus. Brit.), to see that they are in no way identical with *C. brunnescens* Poiret, but that they exactly agree with the figure of the plant given by Syme in vol. x. t. 1632.—A dwarf form, barely 20 cm. high, occurs near the Bishop of Worcester's palace, Hartlebury (*P. N. Fraser*).

f. LONGIFOLIA.

Folia culmo sat vel multum longiora.

Hab. England; Northumberland (*Winch*, 1830, in Herb. Kew.), Leckby Car in Yorkshire (*G. Webster*). Belgium: Louette near Namur (*Gravet*, 1861, in Rel. Maille. n. 1811). Sweden: on the banks of Lake Grycken, Stora Schedwie (*Steffenburg*, 1859, in Rel. Maille. n. 1810). Germany: Gorayer Berg in Prussia (*Hülsen*). Probably also elsewhere.

Linnæus's description of *C. canescens* is brief, and not very characteristic:—"Carex spiculis subrotundis remotis sessilibus obtusis androgynis, capsulis ovatis obtusiusculis." It is represented by n. 34 in his Herbarium; also by n. 10. The latter is, however, labelled "*C. brizoides*" but is not the *C. brizoides* of Sp. Plant. ed. 2, 1382.

Var. β TENUIS Lang in Linnæa, xxiv. 538 (1851).

Omnino tenuior gracilior et minus stricta. Folia angustiora, margine scabra. Spiculæ 4–5, pauciforæ.

Hab. Not very common. England: Hartlebury in Worcestershire (*Fraser*). Sweden: Wexiö (*Scheutz*). Russia; Jitomir, in the government of Volhynia (*Golde*). In a wet copse near Erlangen, in Bavaria, Lang found a matted mass of this plant with eighteen culms on a single tuft.

f. LONGIBRACTEATA Asch. & Graebn. Syn. Mitteleur. Fl. ii. 2, 61 (1902).

Spicula infima a bractea longa apicem versus setacea subtenta, hacce bractea plerumque subulata.

Syn. *C. Kanitzii* Porcius, Fl. Phanerog. district. Naseud. 31 (1881).

This is not an uncommon form of the variety. Among other places, it is found in Perthshire (*White*), Switzerland (*Moricand* in Herb. Kew.), and Germany (*Ascherson*), as well as where it appears to have been first observed (or at least named), at Rodna in the county of Naszod, Hungary.

Var. γ LÆTEVIRENS Asch. Fl. Brandenb. i. 770 (1864).

Læte virens, minime stricta vel debilis. Caulis et folia elongata.

Hab. Germany; rare, in shady places in woods, by the village of Weggum near Boitzenburg (*Seel*).

Var. δ SUBLOLIACEA Læstad. in Hartman, Skand. Fl. ed. 4, 299 (1843); *Andersson*, Cyperaceæ Scandinaviæ, 57 (1849); *Fiek*, Fl. Schles. 481 (1881); *Asch. & Graebn.* l. c.

Syn.—*C. Lapponica* Lang in Linnæa, xxiv. 539 (1851).

Rhizoma breviter stoloniferum. Culmi graciles quidem autem stricte erecti scabriusculi. Folia gramineo-viridia stricta margine scabra, nervis 11 (7 validis, 4 debilioribus) percursa. Spiculæ 3–5, pauciforæ remotiusculæ parvæ subglobosæ, infima distante. Nux virens ovata, margine lævis, ore minute truncato, 1¾–2 mm. long.

Hab. Norway: cold swamps near Tromsö (*A. Notö* in *A. Kneucker*, Carices exs. xii. 333 [1904]); near Egeland railway-station, in the amt of Bratsberg, *Caroline Rosenberg*, 1874)—both in Herb. Kew. Sweden: Lappland (*Wahlenberg*, *Læstadius*, in Herb. Kew.). Germany: Silesia (*Fiek*). Russia: village of Kossnia, in the Moskau government (*A. Petunnikow*, 1893, n. 99, in Herb. Kew.), and elsewhere in Central Russia. Described by Læstadius from type-specimens in herb. Wahlenberg, in the Botanical Museum of Upsala, which were gathered in Lappland. The above description was drawn up from authentic duplicates in Herb. Kew., and from Miss Rosenberg's specimens in flower.

Var. ε. FALLAX Asch. & Graebn. *l. c.*

Rhizoma stolonibus carens. Culmus 20 cm., erectus strictus basi autem decumbens. Folia glauca, angustiora quam in var. α. Spiculæ 4–5, 4–6 mm. longæ, rotundo-ovoideæ, pauciforæ. Glumæ brunnescentes viridi-carinatæ late hyalino-marginatæ. Nux virens, minor quam eâ var. α, striis circiter 15 a basi ad rostrum percursa.

Syn.—*C. curta* var. *alpicola* (non Wahlenb.) Syme, Engl. Botany, x. 102, et autt. angl.; *C. vitilis* (non Fries) Bab. Man. Brit. Bot. ed. 6, 381; ed. 9, 460 (1904).

This is a mountain plant, and does not occur at low levels. It is found on the hills in the government of Jaroslavl, Russia, near the source of the river Kostroma (*Petrowsky*); on the Riesen Gebirge range of mountains, which separates Germany from Austria; in the Highlands of Scotland; and possibly on Snowdon in Caernarvonshire. In the last case the young specimens in flower which I examined were not sufficiently characteristic, and ripe nuts were not available. It is not the *Carex canescens* L. Fl. Lapponica, n. 332, nor is it a Scandinavian plant at all—as

inferred by some caricologists. This Lapland plant, defined by Linnæus as "C. spicis plurimis remotis sessilibus subrotundis turgidis," though included by him in the synonyms of *C. canescens*, is *C. brunnescens* Poiret, first described by Persoon as *C. curta* var. *brunnescens* (1807) := *C. canescens* var. *alpicola* Wahlenb. = *C. Persoonii* Sieber exs. 1821 (according to an authentic specimen under this date in Herb. Kew.) = *C. alpicola* Blytt (1903). On the other hand, *C. vitilis* Fries, which Babington seemed to think was the Scottish alpine plant, is by Ascherson and Graebner made a variety of *C. brunnescens* Poiret, which, however, apparently unaware of Babington's error, they incorrectly state to be found in England.

From specimens in Herb. Brit. this var. *fallax* seems to have been first discovered by Robert Brown in 1794. There are three gatherings of the same date:—(1) boggy ground, side of the hill below Lochnagar towards Invercauld, Aberdeenshire; (2) sparingly in bogs on the tops of the hills between the head of Clova and Invercauld, Aberdeenshire; (3) marshy grounds about three hundred feet below the summit, towards the loch, of Ben Lawers, Breadalbane. Other specimens in Herb. Brit. are from Clova (*Wm. Gardiner*, 1849), top of Glen Dole, Clova (*P. N. Fraser*, 1863), west side of Ben More of Assynt, Sutherland, at 760 m. (*E. S. Marshall*). The examples collected by Mr. Marshall exactly match the figure of the plant described by Syme (t. 1632), which he says is "very abundant on the table-land which separates the counties of Aberdeen and Forfar, at the head of Canlochan Glen." Syme had the plant growing for several years. In herb. Watson are examples, gathered by himself, on the Clova hills at between 610–915 m. (1832), and another from Lochnagar, above the precipice on the north side, within 46 m. of the summit (*Syme*, 1851). In Herb. Kew. are specimens from the rocks of Craig Chailleach, among the mountains of the Breadalbane district of Perthshire (*J. Ball*, 1850). Other records include Ben Lawers, 1897, at 1100 m. (*G. C. Druce* in Bot. Exch. Club Rep. 1897, ii. 572), Ben Heasgarnich, Lochnagar, Glen Callater, and plentiful in the boggy portions of the alpine table-land above Glen Callater, extending into Angus, 1899 (*G. C. Druce*, l. c. ii. 614); also at 1100 m. on the mountains of Ross-shire (*Hooker f.* Stud. Fl. Brit. Isl. ed. 3, 452). In herb. Watson are specimens labelled under this heading from the Cleveland district of Yorkshire (*W. Mudd*), and from Durham (*J. G. Baker*), and these specimens are quoted as authoritative county records in *Topographical Botany*, p. 451; but after careful comparison I find that they are certainly typical *canescens*, and not var. *fallax*; and a pencil-note by the late Mr. C. B. Clarke on another sheet tends to confirm my opinion. The present plant, then, is confined, in Britain, to alpine situations in four Highland counties—Angus, Perthshire, Aberdeenshire, and Rossshire. Examples I have seen from Ben Vrackie in Perthshire (*Drummond Hay*) belong also to this variety; others so labelled by Mr. A. Ley from the Cumberland hills do not. The extension northwards in Europe of *C. canescens* is interesting. It reaches

lat. 71° 6′ at Nordkyn in the amt of Finmarken, in Arctic Norway (*Norman*), and is a common plant on the bleak and desolate Kanin peninsula, in lat. 66° 10′, N. Russia (*Pohle*, in Act. Hort. Petropolit. xxi. 88 [1893]). In Arctic Norway it ascends to 503 m. above the Folden fjord (*Norman*).

Iconography.

Plukenet, Phytographia, t. 34, f. 4 (1691), "Gramen cyperoides elegans, spicâ compositâ molli."—This is the earliest figure of the species.

Rudbeck, Campi Elysii, ii. f. 34 (1701).—Of this sumptuous work probably not more than eight copies are in existence, the issue being almost wholly destroyed in a great fire at Upsala. From a number of the original wooden blocks which escaped destruction Sir James Smith published a truncated re-issue in 1789.

Gottsched, Fl. Prussica, p. 117, t. 32 (1703).—The figure is a small one, but clearly indicates the plant we know under the name "Gramen cyperoides, spicis curtis divulsis." It does not seem to have been recognized as the same plant by Dillen in his edition of Ray's *Synopsis*, p. 423 (1724). It was probably this taking up of Gottsched's name by Linnæus instead of Ray's plant described thirty-three years before that induced Goodenough, the first caricologist, to give the English sedge with "neat, tumid, pale, silvery-white spikelets" (*Smith*, English Fl. iv. 81) the name of *C. curta*, in his paper read before the Linnean Society on 3rd April, 1792. There is some excuse for Goodenough not applying the Linnean name of *C. canescens* to the English plant, as the short description is not very definite, and the examples under this name in the Linnean Herbarium are somewhat mixed.

Oeder, in Fl. Danica, ii. fasc. 5, p. 8. t. 285 (1766).—An excellent figure, of natural size, of a plant growing in marshy places in Norway and Denmark.

Leers, Fl. Herborn. ed. 1. p. 197, t. 14, f. 7 (1775); ed. 2, p. 200, t. 14, f. 7 (1789), "*C. elongata*."—A good figure of a separate spike, with analytical dissections of male and female flowers. Drawn from a plant growing on marshes in the village of Sinn, on the slope of the Mühlenberg, near Herborn, in the province of Hessen-Nassau, Germany. From the description the spikes bear 7–9 spikelets (in the figure there are seven).

Schkuhr, Bot. Hand. ed. 2, iv. p. 50, t. 286, C, n. 13 (1793–94); Beschr. Abb. Riedgr. p. 43, t. C, f. 13 (1801).—A very good coloured figure of the common form.

Willdenow, Carices Berolinenses, in Mem. Acad. Roy. Sc. Berlin, 1794, xix. t. 2, f. 3 (1799).—Reprinted as a tract, "Ueber die in der Gegend von Berlin wildwachsenden Rietgras-Arten" (1795).

Host, Ic. descr. Gramin. Austr. i. 37, t. 48 (1801).—An excellent coloured plate. The figure represents a plant in which the leaves are longer than the culm; it is therefore f. *longifolia*.

Sowerby, Engl. Bot. ed. 1, xx. t. 1386 (Nov. 1804); ed. 3, x. p. 101, t. 1631 (1870), and t. 1632 (var. *fallax*).—The original

figure was drawn from a specimen gathered by W. Borrer, on 11th June, 1804, on a bog near Henfield in Sussex; the figure of var. *fallax* was drawn from an Aberdeenshire specimen. The coloration is above the average of the plates in the third edition, in which the spike in fruit was added, and enlarged dissections redrawn.

Sturm, Monogr. Car. 24.—Characteristic, but on small scale.

Reichb. Ic. Fl. Germ. Helv. viii. p. 7, t. 206, f. 546 (1846).—Like all the Carices in this volume, excellent in detail. By the side of it (f. 547) is a figure of *C. brunnescens* Poiret, which Syme incorrectly quotes for the Scottish alpine plant (var. *fallax*). The former is quite distinct in its more strict and slender habit, with leaves narrower and bright green (not glaucous), and the spikelets more turgid in fruit.

Andersson, l. c. t. 4, f. 39 (1849).—Includes dissected analyses.

Boott, Illustr. g. Carex, p. 154, t. 496 (1867).—Includes dissected analyses.

Hybrids.

The following hybrids of *Carex canescens* with other species have been ascertained :—

1. DIOICA × var. α = C. MICROSTACHYA Ehrhart in Hannover. Mag. st. ix. 132 (1784).— Hamburg, E. Prussia, German Silesia, Upper Austria, Tirol, Baltic Russia, Finnland, and Lappland.

2. ECHINATA × var. ε = C. TETRASTACHYA Traunsteiner ap. Sauter in Flora, 1850, 366 = C. CAFLISCHII Brügger in Jahresber. d. N. Ges. Graub. 1880, 119 = C. BIHARICA Simonkai, Enum. Fl. Transs. 548 (1886).—Scotland, Bavaria, Tirol, and Transylvania. This seems to be the "*C. echinata* f. *grypos*" of Fl. Perthsh. 325, where Dr. White says "the character (glumes with two broad red-brown bands) fits many of our specimens, but I have not seen any that agree altogether with the description of the true *grypos* Schkuhr, though some approach thereto." On the Breadalbane mountains of Perthshire *C. echinata* ascends to 990 m.

3. LACHENALII × var. ε = C. HELVOLA Blytt in Bot. Notis. 1849, 58.—Scotland, Norway, Sweden, and Finnland. In Scotland the hybrid has been found on Lochnagar in Aberdeenshire (*J. H. Balfour* in herb. Edinb. 1846), and on Ben Lawers in Perthshire (*Rev. W. O. Wait*, 1896). The identification of Prof. Balfour's plant is recorded by Mr. Arthur Bennett in this Journal for 1886, p. 149, after being confirmed by Blytt himself. For a critical account of this plant, see a paper by Mr. G. C. Druce in Journ. Linn. Soc. xxxiii. 458 (July, 1898). There are specimens in Herb. Kew. and Herb. Mus. Brit.

4. LOLIACEA × var. α Grütter in P. Ö. G. Königsb. xxxviii, 49. —Germany: province of E. Prussia.

5. NORVEGICA × var. α = *C. pseudohelvola* Kihlman in Herb. Mus. Fenn. ed. 2, 125, et in Herb. Normale, n. 3095, ex Meddel. Soc. Faun. Flor. Fenn. 1888–1891, 71; et Hjelt. Consp. fl. Fenn. 256 (1892).—Norway, Sweden, and Finnland.

6. PANICULATA × var. *α* = C. LUDIBUNDA Gay in Ann. Sc. 1838, 357.—German Silesia.

7. PARADOXA × var. *α* = C. SCHÜTZEANA Figert in Allg. Bot. Zeit. v. 186.—German Silesia.

8. REMOTA × var. *α* = C. ARTHURIANA Beckmann & Figert in Ber. Deutsch. Bot. Ges. vii. 30.—Prussia and Swizerland.

The two Scottish hybrids are therefore of special interest. In his *List of British Plants* (January, 1908), Mr. G. C. Druce gives three vice-counties for × *C. helvola*; in the *London Catalogue*, ed. 10 (February, 1908), Rev. E. S. Marshall gives a single vice-county. From specimens in Herb. Kew. marked "? *C. helvola*," I believe the third is probably Angus.

The hybrid with *C. dioica* is probably the most frequent, and is figured by Boott, Illustr. g. Carex, t. 470.

In 68 specimens of the common form Boott found one with three spikelets, 10 with four, 22 with five, 22 with six, 9 with seven, and 4 with eight spikelets. The average therefore seems to be 5–6.

AMATEUR NOMENCLATURE.

By James Britten, F.L.S.

Under the somewhat curious heading "*Lyonsia straminea* R. Br. = *L. straminea* (R. Br.) Benth. and Mueller," Prof. A. J. Ewart publishes in Proc. Royal Soc. Victoria xx. 132 (1908) a comment upon my paper in this Journal for 1907, p. 235. The paper is so recent and so easily accessible that there is no need to repeat its contentions; but it may be well to reprint Prof. Ewart's note and to deal briefly with the misapprehensions on which it seems to be based. The note is as follows:—

"In pursuing some interesting archæological but hardly botanical studies, Britten concludes that the *L. reticulata* of F. v. Mueller is the true *L. straminea* of R. Br., and proposes a new name (*L. Brownii*) for the plant, supposed to be Brown's *L. straminea* by Bentham and Mueller. A more confusing and unnecessary addition to synonymy could hardly be proposed, and it is interesting to note on p. 240 that Britten sharply criticizes Druce for a similar addition to synonymy based on no more certain grounds. Britten admits that 'Brown published no detailed description of the species,' but considers that De Candolle's description of *L. straminea* referred, 'at any rate in part,' to Mueller's *reticulata*, and that Bauer's figure was named 'doubtless on Brown's authority,' *L. straminea*. Vague assumptions of this kind afford no grounds for troublesome changes of long-standing names. Indeed, a work of this character tends to bring systematic botany into bad odour with workers in other branches, who suffer from such changes, and if there is any difficulty in regard to the specimens at the National Museum, London, surely the proper

course is to add explanatory labels to them, as in the above heading. Archæology and botany are separate subjects, and should be kept apart.

"Article 50 of the International Rules of Botanical Nomenclature, 1905, says:—'No one is authorized to reject, change, or modify a name (or combination of names) because of the existence of an earlier homonym, which is universally regarded as non-valid, or for any other motive either contestable or of little import.' Hence the names should remain as before, *L. Brownii* Britten being a synonym for *L. straminea* (R. Br.), Bentham and Mueller."

I am at a loss to understand what is meant by the repeated reference to "archæology" in Prof. Ewart's note. My paper is based entirely on an examination of various types which, in the case of Robert Brown's plants, exist only in what Prof. Ewart calls "the National Museum," where only any difficulty regarding their interpretation can be solved by comparison with his MSS. When he is better acquainted with the literary history of Australian botany he will know that the connection of Brown with Bauer's work is no "vague assumption"; and the "explanatory label" which he suggests should be added to Brown's type involves a statement which, as I have shown in the synonymy appended to my paper, is exactly contrary to fact; for nothing can be more certain than that *L. straminea* R. Br. is *not* equivalent to "*L. straminea* Benth. & Mueller."

With regard to what Prof. Ewart regards as "a similar addition to synonymy based on no more certain grounds," he does not seem to have observed that in that case reference to the type showed conclusively that the proposed change of name could not be adopted—an exact converse of the case of *Lyonsia*.

I fail to see that Prof. Ewart's citation of Art. 50 of the Vienna Rules has any bearing on the point at issue; and the inference he draws from it seems to me unjustifiable. As Prof. Ewart himself disregards the Rules and "thinks it impossible to follow Mr. Maiden"—and most other botanists—in regarding them as binding, I do not quite see why he quotes them against me. This dictum appears in the paper from which the note on *Lyonsia* is an extract, and is prefaced by some criticisms on the Rules. By these, as having been made by "a fortuitous concourse almost solely of systematists," Prof. Ewart declines to be bound, and he expresses his views regarding them in the *ex cathedrâ* manner which characterizes his writings. At the Vienna Congress, he says, "physiologists and anatomists were conspicuous by their absence; yet the man who has intimately investigated the structure and properties of a plant has a greater claim to decide that its name shall not be altered than the systematist whose interest in the plant largely ceases as soon as it is labelled, and is often only revived when a chance of relabelling it occurs." The meaning of this is not precisely clear, for in a previous sentence complaint is made, not that systematists "decide that a name shall not be altered," but that their tendency is towards "frivolous changes of name." But surely the principle of priority, which has hitherto been recognized, however imperfectly,

as that which decides what name should be retained, has little to do with "structure and properties"?

A further glance into Prof. Ewart's published papers seems to show that it is not only the Vienna Rules to which he refuses allegiance; his attitude towards nomenclature is one of entire independence of general practice, if indeed he has made himself acquainted therewith, which seems doubtful. A few instances, gathered from his contributions to the *Victorian Naturalist* and the *Proceedings of the Royal Society of Victoria*, will make my meaning clear.

In the paper already quoted Prof. Ewart identifies *Eriostemon gracile* Graham with *E. difformis* A. Cunn.: "*E. gracile*," he says, "is the older name, but to change the current one would be a frivolous interference with established nomenclature." This *ipse dixit* is clearly not based on a knowledge of the "structure and properties" of Graham's plant, of which Prof. Ewart has not seen the type, although he says specimens from the Grampians "appear to be authentic"—a word which is usually applied only to types; and if we accept the identity of the two plants, there can be no doubt that *E. gracile* (1834) must replace *E. difformis* (1837).

Again, the paragraph headed "*Daviesia corymbosa* var. *St. Johnii* = *D. corymbosa* var. *virgata*" begins "This plant was recorded in the *Victorian Naturalist*, Nov. 1906, p. 133" and continues "the name should be variety *virgata*, in recognition of the old specific name for the variety." Prof. Ewart was quite within his rights in giving a new name to the variety, if indeed the plant deserves varietal distinction, for a reference to the *Victorian Naturalist* l. c. shows that the name "var. *St. Johnii*" occurs, without either authority or description, in the list of an exhibition of wild flowers, and thus, as a *nomen nudum*, has no claim to recognition. But his reason for the substitution is not in accordance with the Vienna Rules, nor has it been generally regarded as necessary to take up the name of a species when the plant bearing it is reduced to varietal rank.

In *Proc. Royal Soc. Victoria* xx. 80, issued August, 1907, Prof. Ewart heads a paragraph "*Gunniopsis intermedia* Diels . . . = *Aizoon intermedium* Diels." This latter name is given because, in Prof. Ewart's opinion, there is no ground for separating *Gunniopsis* as a genus. But Dr. Diels thought otherwise, and there can be no possible justification for attaching his name to a combination which it is obvious he would not have sanctioned. Prof. Ewart goes on to say "This new species appears to be the same as the *Aizoon glabrum* recorded by Mr. Luehmann, but of which no description was published." The paper from which this is an extract was read July 11, 1907; by November Prof. Ewart had altered his mind as to the identity, for in the same volume, p. 128, he says that "*A. intermedium* Diels" comes very close to some specimens included by F. v. Mueller in *A. zygophylloides*, "and may ultimately prove to have not more than a varietal significance; it is, however, quite distinct from Luehmann's undescribed *A. glabrum*," of which a description follows.

Another example of "making a man say what he has not said" may be found in "*Lepidopetalum* (Bl.) *tenax* Benth." (*Proc. R. S. Vict.* xix. 41), as to which I transcribe Prof. Ewart's note in full:— "Specimens of *Lepidopetalum australis* F. v. M., MS., collected by Hill at Moreton Bay, were sent to Kew and returned marked 'genus correct, species not at Kew.' On further examination they were found to be identical with specimens named *Ratonia tenax* Benth. by Bentham himself, and from the same locality and collector. The species, therefore, becomes *Lepidopetalum tenax* Benth., for which *Cupania tenax* A. Cunn., *Ratonia tenax* Benth., and *Lepidopetalum australis* F. v. M. are synonyms." Here Bentham's name is attached to a combination of which he never heard, for it is here first published, and which he would certainly not have sanctioned, for in their *Genera Plantarum* he and Sir Joseph Hooker sink the genus in *Ratonia*, under which Bentham (*Fl. Austral.* i. 461) places the plant. Nor is the new combination likely to find acceptance, for Radlkofer (*Pflanzenfamilien* iii. 5, 349) places the Australian plants referred to *Ratonia* under a new genus, *Toechima*—a fact which Prof. Ewart has apparently overlooked.

One more instance of creation—and that assuredly not on the ground of "intimate investigation of structure and properties," for Prof. Ewart has never seen the plant—may be cited: it appears under the heading "*Tysonia phyllostegia* F. v. M. = *Swinburnia phyllostegia* F. v. M." "This plant was described in the *Chemist and Druggist* of Australia, Oct. 1, 1896, at the time of Mueller's death. A description but no specimens are in the Herbarium. The latter were apparently claimed and retained by Mueller's executors. Mueller was evidently unaware of the existence of a prior generic name of *Tysonia* Bolus, *Boraginaceæ*, represented by one African species. Mueller's name therefore may be replaced [by] *Swinburnia phyllostegia*, the generic name commemorating the services of the present Minister of Agriculture to botanical research" (*Proc. Roy. Soc. Vict.* xx. 85, 1907). It would be difficult to imagine a more flagrant example of making a man say what he *could not* have said; but the absurdity of attributing to F. v. Mueller a name created eleven years after his death does not seem to have occurred to Prof. Ewart.

An undesirable innovation which has Prof. Ewart's sanction both in theory and in practice is the publication of "provisional" species. The late J. G. Luehmann seems to have been accustomed to exhibit at the meetings of the Victoria Field Naturalists' Club plants which he considered and named as new, but of which he published no description. Such names are of course entitled to no recognition and should not be quoted, but Prof. Ewart takes them up, as we have seen in the case of *Aizoon glabrum*, and publishes them "as provisional species in the hope that local collectors may be enabled to collect and forward dried and fresh specimens of the plants in question for identification" (Victorian Nat. xxiii. 43, June 1906). This announcement immediately precedes a description of "*Triglochin turrifera*, n. sp.?" and follows one of "*Aren-*

aria axillaris Luehm." In the same journal (p. 120), Mr. F. M. Reader identifies the latter with a variety of *Stellaria glauca* which he collected in Luehmann's locality for his plant; the former was identified by F. v. Mueller with *T. calcitrapa* Hook., and the identification was accepted by Luehmann himself. Prof. Ewart (Vict. Nat. xxiv. 60) endorses the identification and says that "the provisional name of *T. turrifera* may be suppressed"; but notwithstanding this his heading expresses doubt—"*Triglochin turrifera* Lueh. = *T. calcitrapa* Hook.?"

It would be easy to find further ground for criticism in Prof. Ewart's papers, especially as it is not always easy to ascertain his meaning—what relation, for instance, does "*Angianthus humifusus* Benth. var. *grandiflorus*, new var. (Compositæ), M. Koch" (*Proc. R. S. Vict.* xx. 76, 1907), which is not described, bear to *A. humifusus* var. *grandiflorus* Benth. Fl. Austral. iii. 563 (1866)? The next entry in this paper is "*Baeckea crispiflora* F. v. M. var. *tenuior*." In this case the variety is not specified as new, but it appears to be so, as it is briefly characterized. "*Eucalyptus Leichhardtii* Bailey = *E. eximia* Schau. var. *Leichhardtii* Bailey" (Vict. Nat. xxiv. 56) is another example of making a man say what he did not say: Mr. Bailey published the plant as a species, but its reduction to varietal rank is due to Prof. Ewart, who is probably right in so doing; although, as he says it is only distinguished from the species, of which "no doubt can exist" that it is a somewhat dwarfed form, by the "somewhat smaller" leaves and fruit, it seems doubtful whether it deserves even varietal distinction.

But enough has been said to show that whatever distinction Prof. Ewart may have attained in other walks of botany, it hardly becomes him to speak *ex cathedrâ* on a subject which he evidently has not studied, and the elementary principles of which he has not mastered.

THE BRITISH SPECIES OF *ARCTIUM*.

By William H. Beeby, F.L.S.

Botanists will no doubt have observed the discrepancies existing between the arrangement of this genus as given in the ninth edition of Babington's *Manual*, and that of the last edition of the *London Catalogue*, where *A. nemorosum* Lej. is meant to stand for the plants we have formerly called *A. intermedium* Lange, while the true *A. nemorosum* is represented by Mr. Bennett's new synonym *A. Newbouldii*.

Some twenty years ago, when I was working up this genus and cultivating some of the forms, a considerable number of authentic examples of *A. intermedium* Lange passed through my hands; but among them all there was not one single specimen of *A. nemorosum* Lej. They consisted of two forms: first, a rather large-headed form of *A. minus* corresponding to var. *purpurascens*

Blytt ("= v. *majusculum* Hartm. ed. 9? excl. cit. Rchb."); and secondly, the hybrid *A. majus* × *minus*.

About the same time I felt it desirable to see an authentic specimen of *A. nemorosum*, and as I could not find one here, I applied to the Brussels Museum, and by the courtesy of the Director I was able to borrow an authentic example collected by Lejeune himself. This proved to be the species to which we have always applied the name *A. nemorosum*—the plant "with the heads agglomerated (and almost sessile) at the apex of the principal stems," to which Mr. Bennett has since given the name *A. Newbouldii* on the supposition that it is a form unknown on the Continent. As it seemed to me undesirable that the identification of Lejeune's *nemorosum* with our British *nemorosum* should rest on my opinion alone, I asked Mr. Henry Groves, who had paid a good deal of attention to the genus, to come and see the plant. This he did, and the result of his examination of the plant is no doubt embodied in the arrangement given in the *Manual*.

In the 1883 distribution of the Botanical Exchange Club, Townsend sent out a plant labelled "*Arctium intermedium* Lange. Open places in woods. Honington, Warwickshire. Sept. 1883." Dr. Lange's report on the name is instructive. It ran:—"Certainly; but somewhat different from our plant, which always occurs in shadow (woods). We consider *A. intermedium* and *A. nemorosum* Lej. synonymous" (*Bot. Exch. Club Report*, 1883, p. 90). The plant in question is a well-marked example of *A. majus* × *minus*, and has not even a superficial resemblance to *A. nemorosum* Lej.

I have also in my collection a specimen acquired about the same time labelled, "Plantæ Guestphalicæ.—*Lappa macrosperma* Wallr. In silvis. Hamm. Aug. 1887, G. Runge." Lange quotes this name as a later synonym of *A. nemorosum* Lej., and certainly this specimen is excellent *nemorosum*. I sent this plant as well as others for Mr. Bennett to see, and he returned it with the remark: "Is, I suppose, what we should call *nemorosum* Lej." Mr. Bennett's "*nemorosum*" of that period was of course the true plant, and he seems to have forgotten having seen this continental specimen. *A. nemorosum* is essentially a woodland plant, and no doubt it constituted yet another component of Lange's many-faced *intermedium*. If so, it may account for Körnicke's identification.

I very much doubt whether we have any fourth species to support the name *A. pubens* Bab. If so, I am unacquainted with it, though I believe that Messrs. Groves are satisfied of the existence of such a plant.

With regard to hybrids, I think that there is no doubt about our *A. majus* × *minus*; I have it from several counties, and the plants agree very well with foreign specimens so named. Moreover, I shook out a number of fruits from Townsend's plant, and selecting fifty-six which were fully formed externally, I found that no fewer than forty-six of these were mere empty husks containing no vestige of seed, while the remaining ten contained apparently

perfect seeds. For the sake of comparison, I have now taken twenty fruits from a plant of *A. minus*, and I find that every one contains good seed; also twenty-three fruits from a plant of *A. nemorosum*, with the result that twenty-two contain good seed while one is abortive. I believe that I also have *A. minus* × *nemorosum*, but of this I am not certain. So far I have seen nothing that can be referred to *A. majus* × *nemorosum*, although this, as well as the other two hybrids, all occur in Scandinavia according to the last edition of the *Förteckning*.

According to my views, the British list comprises the following forms:—

A. majus Bernh.
majus × *minus* = *A. intermedium* Lange p. p.!
minus Bernh.
v. *purpurascens* Blytt = *A. intermedium* Lange p. p.!
minus × *nemorosum*?
nemorosum Lej.! = *A. Newbouldii* Ar. Benn.!
[*pubens* Bab.?]

None of the specimens labelled *A. intermedium* in Herb. Hyltén-Cavallius are referable to *A. nemorosum*, which I have not seen from Norway or Sweden, though it doubtless occurs there.

THE DISTRIBUTION OF *LUNULARIA CRUCIATA*.

By Symers M. Macvicar.

The distribution of *Lunularia* in England should be investigated without delay. It is probably already too late to solve some of the questions connected with the subject, but it is an increasing species, and its present distribution should at least be noted. The points to be remembered are: Can this Mediterranean hepatic be considered as a native of any part of our south coast? This question cannot perhaps be answered with certainty now, but an accurate knowledge of its present localities in that region might assist. The difficulty is increased when it is taken into consideration that the species has doubtless entered England with garden plants, as it has done into other North European countries. This is how it entered those countries; but as we have some undoubtedly native Mediterranean species on our south coast, the possibility of *Lunularia* being one of them must be taken into account.

Assistance may be given by learning what our earliest botanists who refer to the plant say, as Ray and one or two others; but it is probable that only the most evident habitats would be noted, and those are, of course, gardens and their neighbourhood. The earliest to which I have access, Withering, says, "Shady courts and garden walks." A list of references to British authors will be found under this species in Nees's Eur. Leb. vol. 4, p. 17.

The next point is its method of extension at the present time,

and the effect of this on other species. Mr. W. E. Nicholson sends me this interesting note from Lewes, Sussex:—"Years ago *Marchantia* was not uncommon in our garden and in pots in greenhouses. Now, however, it is very scarce, and its place seems almost entirely taken by the *Lunularia*. The latter appears to hold its own here, where it has to combat with the native vegetation, and I have noticed it forming a stout leathery frond, blackish underneath, under somewhat sclerophytic conditions."

I give some notes on its distribution in Scotland which may assist. In the south-east counties it is widely distributed in gardens, and when these gardens are situated close to a ravine, the species spreads into this ravine and frequently occurs in abundance, becoming naturalized among the other vegetation, so much so that those who do not know the history of the plant invariably consider it to be a native. If a garden is not at the present time close to such ravine, the evidences of former habitations are to be found. On the other hand, it has not been found in any of the ravines remote from present or past habitations. In the south-west counties the species has only been found near gardens, houses, and adjoining waste places, with the exception of one locality where a specimen was found "about a mile from houses."

The naturalization of alien plants of a southern type in the east and not in the west of Scotland occurs also in the case of phanerogams. In the Central Highlands the species is rare, and has also been found only in or near gardens and waste places. Its distribution in the Eastern Highlands is not well known yet. It is probably rare, as among the numerous hepatics which I have seen from that district, *Lunularia* has only been sent me thrice, the localities being near habitations. In the West Highlands it is very rare, and has only been found in, or by the side of, gardens, and near houses. The only locality which I have seen it in West Inverness is in a greenhouse, in fern-pots brought from Cambridgeshire. From the Northern Highlands I have seen a specimen from Caithness, from a garden close to some ferns "probably brought from England a few years ago." Whether the species will spread to any extent out of gardens on the west side of Scotland is doubtful, but that it will extend its range on the east is probable.

Lunularia is not mentioned by the earlier Scottish botanists, nor are there any specimens of it in the Edinburgh Herbarium, except one of Taylor's, in Greville's collection, from Dunkerron, Ireland, dated 1844. That most accurate botanist, Greville, does not give it in his *Flora Edinensis*, 1824. He gives *Marchantia* as "plentiful," which would at the present time rather apply to *Lunularia*. At the same time he mentions *Frullania Tamarisci* as "plentiful" and *F. dilatata* as "extremely common." The former is now rare near Edinburgh, and the latter is uncommon. This is no doubt mainly due to the increased impurity of the air around the city. I do not know if *Marchantia* is affected in this way, but it is probable that Greville did not see enough of *Lunu-*

laria to gain much knowledge of the species, and that he did not distinguish it from *Marchantia*. He could hardly make this mistake at the present time, as *Lunularia* occurs in profusion in most of the ravines near Edinburgh, and its almost unmistakable lunulate gemmiferous receptacles are nearly always in evidence. Some knowledge of the rate at which the species increases in definite localities is much required.

It is to be hoped that some English botanist will take up the distribution of *Lunularia*. It will require the co-operation of all interested in the subject in sending accurate notes of observation on its present occurrence, and former history if possible, its relation to gardens, &c.; its means of dispersal, by plants being carried along streams as well as by gemmæ—fruit occurs so rarely that it can have little effect—and its effect on other species. At the same time much interesting matter may be learnt regarding the distribution of *Marchantia*, as it is one of the species which, although undoubtedly native, has its range increased by means of gardens.

NOTES ON THE FLORA OF DORSETSHIRE.

By G. Claridge Druce, M.A., F.L.S.

The following notes include some observations I made during unsuccessful searches for *Vicia lævigata* Sm., and in visiting the locality for *Leucojum vernum*, &c. With these I have incorporated some notes made by my friend the late Mr. C. W. Dale—*Dale*—a distinguished entomologist, others made by Mr. Bolton King—*K*—about 1882, and a few entered in my copy of the *Flora of Dorset* by the Rev. H. J. Riddelsdell—*R*—in 1907. I have also added one or two earlier references than those given by Mr. Mansell-Pleydell as the "first record." An asterisk means an addition to the county flora. Alien plants are indicated by †. The letters in brackets—A, B, &c.—refer to the districts of the *Flora of Dorsetshire*. The nomenclature is that of my *List of British Plants*.

**Ranunculus Steveni* Andrzj. Near Wootton Fitzpayne and Bridport (A).—*†*Nigella sativa* L. By the road in the scattered village of Tarrant Keynstone; but I did not see it in the gardens there (F).

Papaver Rhœas L. *var. *Pryorii* Druce. Tarrant Keynstone (F).—*Glaucium flavum* Crantz. Lulworth Cove (C).

Coronopus didymus Sm. Portland. Between Hamworthy and Lytchett (F).—*Thlaspi arvense* L. Hamworthy (F).—*Lepidium campestre* Br. Glanville Wootton (E), *C. W. Dale*. Bank of the Fleet near Mount Video (C), *R.*—*L. heterophyllum* Benth. var. *canescens* Gren. & Godr. Portland (C).—†*L. Draba* L. Portland (C).—*Cochlearia officinalis* L. Chesil Bank, Abbotsbury (C), *R.*—*Sisymbrium officinale* Scop. var. *leiocarpum* DC. Portland (C).—*Erysimum cheiranthoides* L. Portland.—*Brassica*

nigra Koch. Portland, common (C). — *Cakile maritima* Scop. Portland (C). — *Crambe maritima* L. First record given as Pulteney, 1799; but is not "Brassica marina silvestris multiflora monospermos Lob. . . . ad Portlandiam insulam" (Lobel, *Adversaria*, 92 (1576)) this plant?

Viola canina L. *var. *calcarea* Reichb. Near Charmouth (A). —**V. segetalis* Jord. Hamworthy (F).

Silene maritima With. Chesil Beach, often as a small-leaved form, but not so extreme as the Looe Pool Bar variety (C).—*S. anglica* L. Between Hamworthy and Lytchett (F).—**Lychnis dioica* × *alba*. Chesil Bank, Abbotsbury (C), *R.* — *Cerastium tetrandrum* Curtis. Portland Bill (C). — *Arenaria Peploides* L. First record: "In Angliæ insulis Australibus, ea præsertim quæ Portlandia vocatur," Lobel, *Adversaria*, 195 (1576).—*Sagina maritima* Don. Chesil Bank, Abbotsbury (C), *R.* — *S. apetala* Ard. Weymouth, Poole (C).—*S. ciliata* Fries. Weymouth (C).—*Spergula arvensis* L., segregate. Portland (C). Lytchett (F).—*Spergularia media* Presl. Chesil Bank (C). — Var. *glandulosa* Druce. Chesil Beach (C).

Radiola Linoides Roth. Creech Heath (G), *K.*

Geranium columbinum L. North Down (F), *K.*—*G. Robertianum* L. var. *purpureum* Forster. Chesil Bank, Abbotsbury, *R.* Portland Isle (C).—*Erodium moschatum* L'Hérit. Portland Cliffs, native (C), *R.*

Rhamnus Frangula L. G. Wootton (E), *C. W. Dale.* — *R. catharticus* L. Tarrant Keynstone (F).

Acer campestre L. *var. *leiocarpon* Wallr. Tarrant Keynstone (F).

Genista tinctoria L. Fields north of the Fleet (C), *R.*—*Ulex Gallii* Planch. First record is that of Planchon ("from Dorset") in *Ann. Sc. Nat.* 3 sér. xix. 207 (1849). — *Medicago lupulina* L. *var. *Willdenowiana* Koch. Weymouth; also a very pubescent form near Sandsfoot Castle (C). — *M. arabica* Huds. Chesil Bank, Upwey (C), *R.* Ham Ballast Quay (F), *K.*—*M. denticulata* Willd. Ham Ballast Quay (F), *K.* — *Melilotus officinalis* Lam. Portland (C). — *Trifolium fragiferum* L. Portland (C). — *Lotus uliginosus* Schkuhr. Near Lytchett, as the *var. *glaber* Breb. (F). —*Hippocrepis comosa* L. Lulworth, Weymouth (C), *R.* North Down, Blandford (F), *K.* — [*Vicia lævigata* Sm. (as *V. hybrida*) and *V. lutea* L. date from the second edition of Hudson's *Flora Anglica*, 1778.] — *V. gracilis* Lois. Near Winspit (G), *K.* — *Lathyrus Aphaca* L. Cliffs of Fleet near Monte Video (C), *R.*— *†*L. latifolius* L. Naturalized on the undercliff, Portland (C).

Spiræa Filipendula L. North Down (F), *K.* Portland, on the undercliff (C), *Dale.* — *Potentilla reptans* L. *var. *microphylla* Tratt. Near Weymouth (C). — *†*Fragaria chiloensis* Duchesne. On a hedge-bank near Lytchett Heath (F). Mr. Mansell-Pleydell records *F. elatior* from this locality, but I did not observe it. —*Rosa micrantha* Sm. Tarrant Keynstone, with *R. systyla* Bast. (F).

Saxifraga tridactylites L. Holwell (E), *Dale*. Portland (C), *R*. Abbotsbury (C).

**Sedum sexangulare* L. On walls at Abbotsbury (C), *R*.— †*S. reflexum* L. Holwell (E), *Dale*. Abbotsbury (C), *R*.— *S. Forsterianum* Sm. Naturalized at Abbotsbury, if indeed the Dorset plant be correctly referred to *Forsterianum* (C).

Callitriche obtusangula Le Gall. Speltisbury (F).

Epilobium angustifolium L. Near Cerne (C), *Dale*. Lytchett (F).

Polycarpon tetraphyllum L. The date of the first record is 1778.

†*Tamarix gallica* L. Abbotsbury, *R*. Weymouth (C).

Hydrocotyle vulgaris L. Portland, near the lighthouse (C), *R*. —*Bupleurum tenuissimum* L. Lodmoor (C). — *Apium graveolens* L. Seacombe (G), *K*. — †*Carum Petroselinum* Benth. & Hook. On walls at Abbotsbury (C).—*Fœniculum vulgare* Mill. Sandsfoot Castle, *R*. Portland (C).—*Silaus flavescens* Bernh. Abbotsbury (C), *R*. — *Adoxa Moschatellina* L. G. Wootton (E), *Dale*. Near Bridport (A).—[*Echinophora spinosa* L. "On the Chesil Beach between the Ferry and Portland; and on the cliff between Weymouth and Landsford Castle: Aug. 1837, Rev. A. Bloxam. . . . It was thought to be extinct in Britain until the Rev. Andrew Bloxam discovered it on the coast of Dorset in 1837" (C), Baxter, *Phæn. Botany*, vi. 478. Bloxam almost certainly mistook *Crithmum maritimum*, which is abundant in these localities, for *Echinophora*. Baxter's plate was drawn from a dried [foreign] specimen in the Sherardian Herbarium.]

Sambucus Ebulus L. Near Easton, Portland, abundant (C).

Sherardia arvensis L. *var. *maritimum* Griseb. Portland (C). —*Galium verum* L. *var. *maritimum* DC. Weymouth (C).—*G. verum* × *Mollugo*. Chesil Bank (C). — *Asperula cynanchica* L. Tarrant Keynstone (F).

†*Kentranthus ruber* Druce. Portland, Abbotsbury (C), *R*.; quite naturalized there, also with white flowers. — *Valerianella eriocarpa* Desv. By the lighthouse, Portland (C), *R*. — *V. dentata* Poll. *var. *mixta* (Dufr.). Portland (C).

Arctium minus Bernh. First recorded (for Holwell (G)) by the Rev. H. H. Wood in *Proc. Dorset Nat. Hist. and Field Club*, ii. p. 39 (1878). Portland (C). Near Bridport (A). — *Carduus tenuiflorus* Curt. Parkstone (F). — *Mariana lactea* Hill. Poole (F).—*Carlina vulgaris* L. Portland, luxuriant specimens. Swanage (G). North Down (F).—*Filago minima* Fries. Creech Heath (G), *K*. Near Hamworthy (F).—*Petasites fragrans* Desf. Naturalized at Abbotsbury (C).—*Senecio sylvaticus* L. Cliffs near Preston. Banks of the Fleet near Monte Video (C), *R*. Lytchett (F).— *†*S. squalidus* L. On the railway side, Portland (C).—*S. integrifolius* Clairv. Binden Hill, *R*.—*Inula squarrosa* Bernh. Lulworth Cove, *R*. Abbotsbury (C). — *I. Crithmoides* L. Durleston Head (G), *K*.—*†*Matricaria suaveolens* Pursh. Near the harbour, Poole (F). — *Anthemis nobilis* L. Parkstone (F). — *Hieracium platyphyllum* Ley. Cliffs, Portland, *R*. in *Rep. Bot. Exchange Club*,

1907, 298. Doubtless this is the *H. murorum* of Pulteney.—*H. rigidum* Fr. var. *trichocaulon* Dahlst. Lytchett (F).—*Crepis taraxacifolia* Thuill. Portland (C), *R.*

Campanula glomerata L. Between Minterne and Cerne (C), *Dale.* North Down (F), *K.* Tarrant Keynstone (F). Railway-bank near Weymouth (C).—*Jasione montana* L. Hamworthy (F).

†*Erica lusitanica* Rudolph. Naturalized and seeding freely at Lytchett Heath, near Lord Eustace Cecil's house, in the ground adjoining the garden, whence seedlings originated (F).

Gentiana Pneumonanthe L. Wareham Heath (F), *K.*—*Microcala filiformis* Hoffm. & Link. Creech Heath (G), *K.*—*Centaurium umbellatum* Gilib. *var. *capitatum* Druce. Portland (C). Studland (F).—*Blackstonia perfoliata* Huds. Near Preston coast-guard (C), *K.* G. Wootton (E), *Dale.*

Cuscuta Epithymum Murr. On herbage as well as on furze, Portland (C). South Haven. It was first found, I believe, in Dorset by Lightfoot "In Insula Portland." about 1780.

Veronica scutellata L. Wareham Heath (F), *K.*—**Euphrasia curta* Wetts. Portland (C).—**E. nemorosa* Pers. Tarrant Keynstone (F).—*Antirrhinum Orontium* L. With white flowers at Hamworthy (F).—*Linaria vulgaris* Mill. A pretty form with conspicuous dark yellow palate on the Chesil Bank, Abbotsbury, but the spur was straight, therefore not my variety *pulchella* (C).

Orobanche major L. (*elatior* Sutt.). On the railway-bank, Chesil Beach (C), *Dale.*

**Thymus præcox* Opiz. Near Abbotsbury (C).—*Teucrium Scorodonia* L. On a wall at Abbotsbury (C).—*Galeopsis Tetrahit* L. var. *bifida* Lej. & Court. Lytchett (F).—*Stachys officinalis* Franch. Tarrant Keynstone (F).

Myosotis versicolor Sm. Abbotsbury, Bindon Hill (C), *R.* G. Wootton (E), *Dale.* It is the *M. scorpioides* of the Linnean Herbarium.—*Lithospermum arvense* L. G. Wootton (E), *Dale.* Tarrant Keynstone (F).—†*Symphytum peregrinum* Ledeb. Abbotsbury (C), *R.*—†*Anchusa sempervirens* L. Naturalized at Abbotsbury (C).—†*Borago officinalis* L. Very frequent in Portland (C).—*Echium vulgare* L. Lulworth, plentiful (C), *R.*

Pinguicula lusitanica L. On the west side of Corfe Castle (G), *Sir Joseph Banks.*—*Utricularia minor* L. Wareham Heath (F), *K.*

**Statice linearifolia* Laterr. Portland, Abbotsbury, Weymouth (C). Poole (F).

Chenopodium polyspermum L. Plentiful in a field above Tarrant Keynstone (F).—*C. serotinum* L. Lytchett (F).—*C. album* L. var. *integrifolium.* Lytchett (F).—*Atriplex portucaloides* L. Isle of Purbeck (C), Turner's *Herball*, 1551: the earliest British record.—*Salicornia procumbens* Sm. Lodmoor (C).—*S. appressa* Dum. Specimens too young, but probably this. Poole (F).

Polygonum aviculare L. var. *litorale* (Link). Ham (F).—*Rumex crispus* L. var. *trigranulatus* Syme. Chesil Bank (C), *R.*—**R. acutus* L. Lytchett (F).

†*Hippophæe Rhamnoides* L. Lulworth Cove (C), *Dale*.

Thesium humifusum DC. North Down (F), *K*. In some quantity on Portland (C).

Euphorbia platyphyllos L. Holwell (E), *Dale*. Between Dancing Ledge and Seacombe (G), *K*.—[*E. portlandica* L. The date ("Ray 1690") should be 1724: see W. R. Clarke's *First Records*, 126.]—*E. amygdaloides* L. On boulders at foot of Portland Cliffs (C), *R*.

Parietaria ramiflora Moench var. *fallax* (Gren. & Godr.). Abbotsbury (C), *R*.

Myrica Gale L. First record: about Wareham, Ray's *Historia*. Parkstone (F).

*†*Populus deltoides* Marsh var. *serotina* (Hartig). Near Bailey Gate (F). I have not seen true *P. nigra* in Dorset.

Spiranthes spiralis C. Koch. G. Wootton (E), *Dale*. Tilley Whin (G), *K*.—*Helleborine latifolia* Druce. Cotmore, 1849 (E), *Mr. Dale, Sen*. There also grew *Viola palustris*, *Drosera rotundifolia*, *Menyanthes trifoliata*, *Anagallis tenella*, and *Pedicularis palustris*, but Mr. Dale says the place is now drained.—*H. violacea* Druce. Under the name of *Epipactis purpurata* Mr. Dale, Sen. describes it as being "parasitic on birch and hazel" at Dungeon. It was also found at the foot of an oak by G. B. Wollaston in 1876, and more recently by Mr. C. W. Dale on the roots of an oak going up Revel's Hill.—*Ophrys apifera* Huds. Portland, common. Sands, Portland Ferry (C), *R*.

Iris fœtidissima L. Abundant near Bridport (A). The date of Turner's record is 1562.

Narcissus Pseudo-narcissus L. Middlemarsh. Butterwick (E), *Dale*. Charmouth (A).

Asparagus officinalis L. var. *maritimus* L. Found by Mr. Dale, Sen. on the site of the present torpedo station, near Weymouth (C).—*Ruscus aculeatus* L. Roadside near Chickwell, *R*.

Echinodorus Ranunculoides Engelm. G. Wootton (E), *Dale*. Hixon Head (G), *K*.

Zostera nana Roth. First record, "from Poole Harbour, August, 1847," *E. B. Suppl.* t. 2931.—*Z. marina* L. var. *angustifolia* Hornem. Fleet, near Abbotsbury (C), *R*.—*Potamogeton interruptus* Kit. Spettisbury (F).

Juncus Gerardi Lois. Portland (C), *R*. Lulworth, &c. (C).—*J. bufonius* L. var. *fasciculatus* Koch. Hamworthy (F).

Scirpus maritimus L. Weymouth. Lodmoor (C).—*Carex limosa* L. In *Top. Bot.* ed. 2, *C. magellanica* is given for Dorset, but no mention is made of it in the *Flora*: does *limosa* alone occur?—*C. pendula* Huds. G. Wootton (E), *Dale*. Near Charmouth (A).—*C. distans* L. Portland, near the lighthouse (C), *R*.—*C. humilis* Leysser. Rushton (F).—*C. divisa* Huds. Abbotsbury, in plenty (C), *R*.

Spartina Townsendi Groves. Poole (F), a recent introduction; see *Journ. Bot.* 1908, 80.—*†*Panicum miliaceum* L. A casual at Lyme Regis (A), *F. T. Richards*.—*Alopecurus bulbosus* Gouan. Still occurs at Poole (F).—*Agrostis canina* L. This is given in

the *Flora* as being "generally distributed." I only saw it in the heathy districts. — *Phragmites vulgaris* (Lam.) *var. *subuniflora* (DC.). Near Chesil Bank (C). — *Calamagrostis epigeios* Roth. First record: "in Dorsetshire," Parkinson, *Theatrum*, 1182 (1640). —*Avena pratensis* L. Backwater, Weymouth, *R.* Portland (C). —*A. pubescens* Huds. Holwell (E), *Dale.* Near Rushton (F).— **Arrhenatherum tuberosum* (Gilib.). Chesil Bank, Abbotsbury (C). —**Koeleria gracilis* Pers. Portland (C). Near Blandford (F).— **K. albescens* DC. On the sands at Portland Ferry (C), *R.*— *Dactylis glomerata* L. *var. *abbreviata* Bernh. Portland (C).— *Poa compressa* L. Abbotsbury, *R.* Portland in arable fields (C). —*Desmazeria loliacea* Nyman. Portland Ferry (C), *R.*—*Glyceria distans* Wahl. *var. *temuiflora* Gren. & Godr. Weymouth (C).— *Festuca rubra* L. var. *pruinosa* Hackel. Portland (C).—**Agropyron repens* × *junceum*. Near Sandsfoot Castle. Lodmoor (C). Doubtless the *A. acutum* of the *Flora*.

Ophioglossum vulgatum L. Portland, near lighthouse (C), *R.* G. Wootton and Holwell (E), *Dale.* — *Botrychium Lunaria* Sw. High Stoy (G), *Dale.*

Mr. C. W. Dale also records as additional localities in district "G" the following, all being from Glanville Wootton unless otherwise specified:—*Clematis Vitalba* L., *Ranunculus parviflorus* L. (Holwell), *R. auricomus* L., *R. sardous* Crantz, *R. arvensis* L., *R. peltatus* Schrank, *Chelidonium majus* L., *Radicula palustris* Moench, *Viola hirta* L., *Malva moschata* L., *M. rotundifolia* L., *Geranium lucidum* L. (Long Burton), *Rhamnus Frangula* L., *Genista anglica* L., *Ononis spinosa* L., *Trifolium hybridum* L. (Holwell), *Rubus idæus* L., *Rosa tomentosa* Sm., *R. micrantha* Sm., *R. arvensis* Huds., *Ribes Grossularia* L., *R. rubrum* L., *Chrysosplenium oppositifolium* L., *Cotyledon Umbilicus-Veneris* L. (Holwell), *Myriophyllum alterniflorum* DC. (Holwell), *Peplis Portula* L. (Holwell), *Conium maculatum* L., *Sison Amomum* L., *Sium erectum* Huds., *Asperula odorata* L., *Carduus crispus* L., *Bidens cernua* L., *B. tripartita* L., *Achillea Ptarmica* L., *Valerianella dentata* Poll., *Solanum nigrum* L., *Veronica Anagallis-aquatica* L., *V. montana* L., *Verbena officinalis* L. (Holwell), *Lysimachia nemorum* L., *Samolus Valerandi* L., *Neottia Nidus-avis* Scop. (Mount Silva), *Orchis pyramidalis* L., *Habenaria conopsea* Benth., *H. virescens* Druce, *Fritillaria Meleagris* L. (Dungeon, Beaulieu, mostly the white variety), *Colchicum autumnale* L. (Bishop's Caundle), *Juncoides pilosum* Morong, *J. multiflorum* Druce, *Carex leporina* L., *Avena fatua* L., *Melica uniflora* Retz (Holwell), *Asplenium Adiantum-nigrum* L., *Ceterach officinarum* Willd. (Holwell churchyard-wall), and *Dryopteris aristata* Druce. White varieties of the following plants have been noticed by Mr. C. W. Dale:— *Primula vulgaris* Huds., *Centaurea nigra* L., *Cirsium arvense* Scop., *Scilla non-scripta* Link & Hoffmg., *Bartsia Odontites* Huds., *Scabiosa Succisa* L., *Centaurium umbellatum* Gilib., *Erica Tetralix* L., *Viola odorata* L., *Polygala vulgaris* L., *Symphytum officinale* L., and *Eupatorium cannabinum* L.; as well as pink-flowered forms of *Primula vulgaris* Huds., and *P. veris* L. The Rev.

H. H. Wood records a beautiful variety of *Centaurea nigra* with a white ray and red centre. In the Report of the Sherborne School Field Society, *Juncus maritimus* Lam., *J. subnodulosus* Schrank, and *Crepis taraxacifolia* Thuill. are added to district "B," but the first would not be found in an inland locality.

REPORT OF DEPARTMENT OF BOTANY, BRITISH MUSEUM, 1907.

By A. B. Rendle, D.Sc., F.L.S.

The following additions have been made to the collections by presentation:—396 phanerogams from Uganda, from Dr. A. G. Bagshawe; 245 phanerogams and 30 cryptogams from Rhodesia, from F. Eyles, Esq.; 126 specimens from Uganda, from Mrs. Sybil M. Tufnell; 38 specimens from the Soudan, from the Director of Woods and Forests, Kartoum; 200 specimens from Gazaland, from C. F. M. Swynnerton, Esq.; 50 specimens of *Umbelliferæ* and *Compositæ*, and 43 Monocotyledons from Algeria, from M. A. Joly Elbahy; 48 specimens from South Africa, from Rev. F. A. Rogers (in return for naming); 23 specimens from Lake Kivu, Central Africa, from Dr. Wollaston; 10 specimens from Uganda, from E. Brown, Esq.; 10 specimens from Fayoum, from Dr. W. A. Cunnington; 5 specimens from South Africa, from Dr. H. Bolus; 14 specimens of *Podostemaceæ* from India, from J. C. Willis, Esq.; 4 specimens from Garhwal, from Dr. T. G. Longstaff; 2 specimens of *Wissadula* from Brazil, from R. Fries; 50 specimens of plants from W. Australia, collected by W. V. Fitzgerald, from F. S. Brockman, Esq.; 4 specimens of *Eremophila*, &c., from Australia, from Prof. A. J. Ewart; 390 specimens from Chili, Brazil, and the Falkland Islands, from R. Morton Middleton, Esq.; 2 specimens of orchids from Jamaica, from W. Fawcett, Esq.; 3 specimens of *Ophrys*, from Hyères, from H. S. Thompson, Esq.; 2 specimens of flowering plants from Rev. W. Moyle Rogers; 64 specimens of garden plants for exhibition from the Royal Gardens, Kew; 3 specimens of cultivated plants from Hon. Walter Rothschild, M.P.; specimens of fossil seeds of *Najas marina* and *N. minor* from Clement Reid, Esq.; 2 fruits of *Martynia* from A. E. Stearns, Esq.; 3 specimens of cultivated orchids from Sir Trevor Lawrence; 4 specimens of cultivated orchids from J. O'Brien, Esq.; 2 specimens of *Silene*, from W. B. Paulson, Esq.; specimens of *Alsophila* from Fiji, from Miss M. Benson; specimens of a tropical moss, *Calymperes*, recently discovered in Europe, near the fumaroles of Pantellaria, from Dr. Emilio Levier; 2 species of *Halimeda* and 3 specimens of *Avrainvillea* from the Paumotu Archipelago, from M. P. Hariot; some large specimens of *Laminariaceæ* from the Eastern Telegraph Company's cable near Gibraltar, from V. K. Cornish, Esq.; a Japanese species of *Ecklonia*, from Prof. F. O. Bower; 11 species representing 4 genera of *Lithothamnia* from the Indian Ocean, col-

lected during the 'Sea-lark' Expedition, from J. Stanley Gardiner, Esq.; specimens of *Cladocephalus*, a new genus of algæ from the West Indies, from Mr. Marshall A. Howe; 161 *Characeæ* from the herbarium of T. F. Allen, from the New York Botanical Garden.

The additions to the British Herbarium by presentation have been:—3 specimens from Dr. C. Vigors; 229 specimens from Rev. E. S. Marshall; 72 specimens from Rev. H. J. Riddelsdell; 2 specimens from John D. Young, Esq.; 4 specimens from A. B. Jackson, Esq.; 3 specimens of introduced plants from W. B. Allen, Esq.; 7 specimens from Clement Reid, Esq.; 2 specimens from W. Whitehead, Esq.; 10 specimens of Rubi, &c., from Prof. D. Oliver; 4 specimens from James Groves, Esq.; 10 rare British Hepaticæ from Symers M. Macvicar, Esq.

Among the acquisitions by presentation special reference may be made to the collection of diatoms formed by the late Thomas Glazebrook Rylands, of Warrington, and presented by his daughter, Miss Martha G. Rylands. It consists of about 6000 microscope-slides in cabinets, and includes the collection of the late Dr. Christopher Johnson, of Lancaster, bequeathed to Mr. Rylands. It was formed more than forty years ago, when great activity was manifested in the study of *Diatomaceæ*; and the two most active students of the group, Prof. G. Walker Arnott and Prof. R. K. Greville, and their more important correspondents are represented by numerous letters included in the collection.

The following additions have been made by exchange of duplicates:—1100 specimens from Brazil, Central Asia, Russia, &c., from the Director, Royal Botanic Gardens, St. Petersburg; 494 phanerogams and 12 cryptogams from Singapore, Siam, &c., from the Director of the Botanic Gardens, Singapore; 37 specimens of *Coprosma* from New Zealand, from J. F. Cheeseman, Esq.; 308 specimens from South Africa, collected by R. Schlechter, from the Director of the Botanic Museum, Zurich; 395 specimens from Tibet and 94 specimens from tropical Africa, from the Director, Royal Gardens, Kew; 56 specimens from Jamaica, from the Director of the New York Botanic Garden; 138 specimens from Australia, from the Director of the Botanic Garden, Sydney; 626 specimens from Texas, collected by Lindheimer, from the Director of the Missouri Botanic Garden; 56 specimens from Java, from the Director of the Buitenzorg Botanic Garden; 100 Kryptogamæ Exsiccatæ, from the Hofmuseum, Vienna; 13 specimens of West Australian orchids, from Oswald Sargent, Esq., York, West Australia.

The principal purchases during the year were:—200 specimens "Flora Stiriaca Exsiccata," fasc. 7–10, from Hayek; 273 specimens "Plantæ Paraguarienses," from Dr. Hassler; 227 specimens from South Bolivia, collected by Fiebrig, from Dr. R. Pilger; 200 specimens of Dörfler's Herb. Normale, Cent. 47 and 48, from Dulau & Co.; 370 phanerogams and 82 cryptogams from New Caledonia, collected by R. Schlechter, from Dr. Loesener; 109 phanerogams and 6 cryptogams from Tucuman, Argentina, col-

lected by Dr. L. Dinelli, from W. F. H. Rosenberg; 980 phanerogams and 107 cryptogams from Japan, from Rev. U. Faurie; 299 phanerogams and 10 cryptogams from Mexico, from C. G. Pringle; 62 specimens "Gramineæ Exsiccatæ" (fasc. xxi., xxii.), and 40 specimens *Cyperaceæ* (fasc. vi.), from Kneucker; 179 specimens from the Cameroons, collected by Zenker, from Dr. E. Gilg; 440 specimens, including 31 vascular cryptogams from Mexico collected by Dr. Purpus, from Dr. T. S. Brandegee; 50 specimens "Salicetum Exsiccatum" (fasc. vii.), collected by Toepffer, from Dulau & Co.; 20 phanerogams and 20 cryptogams from West Indies, from W. E. Broadway; 50 specimens "Batotheca Europæa" (fasc. v.), from H. Sudre; 176 phanerogams and 23 cryptogams from Lydia and Caria, and 40 phanerogams and 50 cryptogams from North Persia, and 52 specimens from West Persia, collected by Dr. Strauss, from J. Bornmüller; 59 phanerogams and 1 cryptogam from Transkei, S. Africa, from Miss A. Pegler; 200 North American fungi, from Bartholomew; 200 German fungi, from Sydow; 100 *Uredineæ* and 25 *Ustilagineæ*, from Sydow; 100 fungi imperfecti, from Kabát and Bubák; 75 ascomycetous fungi, from Rehm; 150 Westphalian fungi, from Brinkmann; 50 fungi selecti, from Jaap; 100 micro-fungi, from Vestergren; 53 British micro-fungi, and 36 microscope-preparations, from Miss A. L. Smith; 40 lichens of North England, from Rev. W. Johnson; 813 Bavarian lichens, from Britzelmayr; 20 rare European lichens, from Zahlbruckner; 1214 coloured drawings of lichens, prepared by the late Dr. R. Deakin and illustrating his lichen-herbarium which was presented to the Department in 1889, from Hutchinson; 76 marine algæ of South Australia, from Mrs. Harold; 100 North American algæ, from Collins, Holden, and Setchell; 40 microscope-preparations of diatoms and 105 of fresh-water algæ and *Peridinieæ* from material collected by Dr. W. A. Cunnington in the East African Lakes, from West; 1007 microscope-preparations of British mosses, from Sherrin; 50 mosses of Malay Archipelago, from Fleischer; 20 North American hepaticæ, from Haynes; 424 mosses and hepatics of India, 74 of Japanese Islands, 143 of British New Guinea, 50 of Tasmania, 132 of Guatemala, from Levier; 59 mosses of France, from Husnot; 100 mosses of South Europe, from Fleischer and Warnstorf; 125 cryptogams of Germany, Austria, and Switzerland, from Migula; 116 coloured drawings of Scottish cryptogams by Greville, from Parritt.

Among the acquisitions by purchase special mention should be made of the collection of marine algæ made by the late E. A. L. Batters, consisting of more than 10,000 British and 3000 foreign specimens, and more than 3000 microscope-preparations. The slides add much to the facilities for studying the algæ; and the whole collection affords a good representation of the work done in recent years towards ascertaining the distribution of the species around the coasts of the British Islands.

SHORT NOTES.

North Devon Cryptogams. — A note on the past year's cryptogamic "finds" in North Devon (v.-c. 4) may not be without interest.

I. Musci. In June Mr. W. P. Hiern collected on Ockment Hill, in good fruit, *Tetraplodon mnioides* B. & S. This is a new county record, and is interesting as adding a third species of the *Splachnaceæ* to the South of England, where *Splachnum ampullaceum* L. and *S. sphæricum* L. fil. were already recorded. In May at Berrynarbor I found, on seaward cliffs, *Hypnum molluscum* Hedw. var. *fastigiatum* Bosw.; and in the same parish in June, on the trunk of an ash-tree, *Orthotrichum diaphanum* Schrad. var. *aquaticum* Davies. Both these are new to the county; the latter is known elsewhere only from Sussex. At Challacombe (in the Barnstaple district) I collected, in August, *Brachythecium rivulare* B. & S. var. *cataractarum* Sauter, and *Hypnum fluitans* L. var. *gracile* Boul., both varieties new to the county. Also the following Sphagna :—*Sphagnum molle* Sull. var. *tenerum* Braithw., *S. subnitens* R. & W. (= *S. acutifolium* Ehrh. var. *β subnitens* Dixon) var. *virescens* W. and var. *violascens* W., *S. rubellum* Wils. (= *S. acutifolium* Ehrh. var. *γ rubellum* Russ.), *S. cymbifolium* Ehrh. var. *pallescens* W.

II. Hepaticæ. On Martinhoe cliffs I was able, in 1907, to re-find the following species Mitten had recorded thence in 1875, which had not since been recorded:—*Ptilidium ciliare* Hampe, *Lophozia Floerkii* Schiffn., and *L. quinquedentata* Cogn. (*L. Lyoni* Tayl.), and *Scapania gracilis* Kaal (*S. resupinata* Carr). This year I have found all inland at Challacombe except *Lophozia quinquedentata*; and, in addition, *Scapania purpurascens* Tayl., a new record for v.-c. 4.

III. Algæ. *Ceramium circinatum* Ag. seems to be a new record for section 6 of the fourteen littoral sections of Batters and Holmes. As affecting the question of the growth of *Callymenia Larteriæ* Holmes (see Journ. Bot. 1907, 85), I may note that, after being able throughout 1906 to find here each month a fair number of fragments and some few complete plants, last year, despite careful and continuous search, I got between the months of February and October not a single portion, nor in this year any between January and October. Amongst several pieces found in the former month was, however, a fine full-grown and complete plant, one of the very few really representative specimens washed ashore.

Some of the mosses have been kindly determined by Mr. H. N. Dixon, others by Mr. W. Ingham; the hepatics by Mr. Symers M. Macvicar; and the seaweeds by Mr. E. M. Holmes.—C. E. Larter.

Salvia pratensis L.—The earliest date for this as a British plant is given both by Mr. W. R. Clarke and in Fl. Kent as 1699. The following from Plukenet's *Almagestum*, p. 185 (1696), carries

the record three years further back :—"*Horminum pratense foliis serratis.* C B P. *Gallitrichum sylvestre vulgo, sive sylvestris Sclarea, flore purpureo, cæruleovè magno,* J. B. ibid. 311. Botanici nostrates (ut optime notat Celeberr. noster Raius) hactenùs per errorem habuerunt hanc plantam pro *Hormino sylvestri* vulgo in Angliâ provenient, cum sint omnino diversæ. *Horminum* enim quod apud nos tam frequens sponte oritur *Hormini sylvestris* 4ti. Clusii 5a. species est (i. e.) *Horminum sylv. Lavendulæ flore.* C B P. ex sententiâ Raij & nostrâ, quod idem est Gallitrichis affini Maru si non genus aliquod, *Sclarea Hispanica* Tabern. J. B. T. 3. l. 28. 313. Item Gallitricho flore minore pupurascente, & rubro, ejusd. ibidem. Nihilo minus hoc sylvestre Herbariorum genus, licet Sagacissimo nostro Autore in Angliâ nunquam offendebatur, aliquando utut rarissime apud nos etiam spontaneum occurrit, & idem videtur quod semel saltem (si narratoribus habenda sit fides) in agri Cantiani Vivario Cobhamensi, nuper inventum est."—James Britten.

Rosæ Villosæ in 'London Catalogue' (p. 356).—The discussion between Mr. Barclay and myself seems now to have been carried as far as the readers of this Journal will care to follow it. My main object will have been attained if botanists recognize that the further subdivision of the group, especially of the forms usually placed under *R. tomentosa*, was necessary in view of the modern elaboration of other critical groups. Crépin's later observations show that he did not wish personally to follow out in detail this subdivision: if Mr. Barclay had undertaken it, his opportunities would have enabled him to do the work better and more completely than I have done; and my own attempt can well give way before a better one whenever proposed. No constructive effort in a group of this sort can expect at once to attain finality. For the rest—*solvitur ambulando*: and a few weeks in the field, with my paper and his criticisms upon it in the hand, will do more than any further correspondence to make the crooked places straight.—Augustin Ley.

"Echyrospermum *Schott* in Isis (1823), 1050 (Legumin.) (Quid ?)."—It may perhaps be worth while to dispel the doubt expressed in the above extract in the *Index Kewensis*, and to trace the further use of the name. In *Isis*, l. c., the vernacular synonym Vinhátigo is added—a name which is generally applied to *Plathymenia foliolosa* Benth., and there is nothing in Schott's brief description to show that this was not the plant which he had in view. According to Miers's useful MS. list of the woods of Brazil, arranged under their vernacular names, the name is applied, sometimes with modifications, to other *Leguminosæ*. In 1864 Saldanha da Gama published (Config. i. 39) a long description of "Vinhatico—Genero *Echirospermum*," with a plate which certainly does not represent *Plathymenia*. Of this Bentham says (Fl. Bras. xv. 2, 122) "*Echirospermum* Allemão ex Saldanha da Gama Config. e Descr. Madeiras Rio de Jan. 39 cum ic., genus ex arboribus pluribus diversis confectum est, quarum altera est forte

Cassiæ bifloræ varietas, fructus tamen cum folio *Cæsalpiniæ* cujusdam, flores fig. 4, 5 et 6 omnino alieni." In the *Breve Noticia sobre a Collecçao das Madeiras do Brasil* sent to the Paris International Exhibition in 1867 a specific name is added—*Echyrospermum Balthasarii* Fr. All.—and it appears under this name in Saldanha da Gama's *Synonymia de diversos vegetaes do Brasil* (1868).—JAMES BRITTEN.

SAXIFRAGA AIZOIDES IN CARNARVONSHIRE.—In the Holmesdale Natural History Club's Herbarium at Reigate there exists an example of this saxifrage labelled, "Snowdon, J. Price." There is little doubt that this is the John Price mentioned in Journ. Bot. 1888, p. 32, who was born in North Wales, and flourished in the early eighties. *S. aizoides* is not on record for Carnarvonshire, either in Griffith's Flora or Watson's Top. Bot. (and Supp.), and this Snowdon locality extends the southern limit of the species in the British Isles by about sixty miles, which is interesting. Irish botanists may contend that the Kerry locality in Mackay's *Fl. Hibernica*, "Connor Cliffs, near Dingle," should be named as the most southerly spot, but Mr. Praeger, in Irish Top. Bot., writes, "The Kerry record is more than doubtful." Botanists visiting this well-known mountain should endeavour to find the plant, as many likely spots exist there.—C. E. SALMON.

COTONEASTER MICROPHYLLA Wall. IN GLOUCESTERSHIRE.—In July last I found a fine young plant of *Cotoneaster microphylla* growing on the sloping edge of Minchinhampton Common, by the roadside leading from Nailsworth to Minchinhampton. The locality is about three miles from Rodborough Common, whence the plant has been recorded (see Journ. Bot. 1906, 357). This Himalayan shrub appears liable to be spread by fruit-eating birds.—R. MORTON MIDDLETON.

CARPODINUS GOSSWEILERI Stapf (p. 211).—By an unfortunate mistake Gossweiler's numbers 1895 and 1813 were included under *Carpodinus Gossweileri*. They represent actually *C. gracilis* Stapf. The localities quoted under the numbers cited should therefore be cancelled, and the description of the general distribution be corrected thus:—South-east Angola, from the River Kebe to the River Kwanavol, and between 15° and 16°. As, further, the note following the distribution paragraph was based on Gossweiler's observations under Nos. 1813 and 1895, that note and the corresponding words in the Latin description must also be cancelled. *C. Gossweileri* is an erect shrub, with virgate shoots up to 45 cm. high.—OTTO STAPF.

ORCHIS HIRCINA L. (p. 363).—This has also been found within the last year or two in both the N. and S. divisions of Wilts. I have seen the photograph of a specimen from Wilton, near Devizes. See Mag. Wilts Archæol. Soc. Dec. 1907, p. 318, and June, 1908, p. 508.—H. J. RIDDELSDELL.

NOTICES OF BOOKS.

Gray's New Manual of Botany. A Handbook of the Flowering Plants and Ferns of the Central and North-eastern United States and adjacent Canada. Rearranged and extensively revised by Benjamin Lincoln Robinson, Asa Gray Professor of Systematic Botany in Harvard University, and Merritt Lyndon Fernald, Assistant Professor of Botany. Seventh Edition, Illustrated. 8vo, cl., pp. 926; 1036 figures in text. New York, Cincinnati, Chicago: American Book Company. Price 2 dollars 50 cents.

This new and "extensively revised" edition of a book which made its first appearance sixty years ago and which of late years has had powerful competitors for public favour will be welcomed by many. When it is remembered that the few botanists of our own little group of islands have long had three British floras at their disposal, it cannot be regarded as superfluous, notwithstanding the existence of Dr. Britton's *Manual*, which has for the last seven years been the most complete and handy summary of the North American Flora. There are of course points of resemblance between the two books, notably in their adoption of the Engler and Prantl arrangement, to which we may expect that of Bentham and Hooker to give place in any new British flora. But there are also notable differences, the chief of which is the introduction into the text of the new "Gray" of more than a thousand small but most useful figures which, in the case of the critical genera to which they are mostly confined, must prove invaluable to the student of orders such as *Cyperaceæ* or of genera such as *Rumex*, where verbal description is too often inadequate to convey the points of differentiation on which determination depends. In the matter of indexing the new *Manual* has a distinct advantage; the names of species as well as of genera are given, and everything is in one alphabet—a time-saving arrangement which should be universally adopted.

We are particularly glad to note that the nomenclature has been brought into entire agreement with the Laws adopted at the Vienna Congress in 1905. This is the more important because Dr. Britton in his *Manual* has adhered to the nomenclature of what is known as the "Rochester Code," thus ignoring the decisions of the representative meeting at Vienna. It is much to be desired that some uniformity of action should be arrived at, such as that which, with slight exceptions, practically exists among European botanists; and we would suggest to the Harvard authorities who are responsible for the book that a list of the names adopted, on the principle of our *London Catalogue*, should be published at small cost for the benefit of those who, while using Dr. Britton's *Manual*, would prefer to employ the nomenclature generally recognized.

We note that Mr. Oakes Ames, who is responsible for the *Orchidaceæ*, retains *Serapias* L. for the plant which until lately has been generally known as *Epipactis latifolia*, while he substi-

tutes "*Epipactis* [Haller] Boehm." for *Goodyera*: the two species common to Britain and North America appearing as *S. Helleborine* L. and *E. repens* (L.) Crantz. It does not come within his scope to tell us what, under this arrangement, becomes of *Serapias Lingua* L.—the type of *Serapias* as nowadays universally understood—which is certainly not congeneric with *S. Helleborine*.

Probably the conclusions on which Mr. Druce (Journ. Bot. 1908, 8) based the substitution of *Helleborine* Hill (1756) for the generally received *Epipactis* had not been accessible to Mr. Ames when his portion of the *Manual* went to press. We have not been able to trace *Epipactis* of Boehmer, so are unable to express any opinion as to how far it can replace *Goodyera* R. Br.—*Peramium* Salisb. cannot stand (see Journ. Bot. 1906, 396).

The help of other specialists is acknowledged. Prof. Hitchcock has elaborated the Grasses; Mr. Ezra Brainerd the genus *Viola*; Dr. Greenman has revised *Senecio*; Mr. A. A. Eaton undertakes *Equisetum* and *Isoetes*. Mr. W. W. Eggleston "has revised the exceedingly difficult genus *Cratægus*" which here runs to sixty-four species; we note here a wholesale reduction of Prof. Sargent's species and of those of other authors, which will not surprise those who have watched the ups and downs of our own critical genera. As a set-off to this, however, we note that Prof. Sargent in papers which appeared since the *Manual* went to press establishes no fewer than 83 new species from the State of New York alone! Compared with this, the exploits of our batologists and hieraciarchs seem mean and trivial.

An interesting tabular view shows that the plants treated in the *Manual* are placed in 157 families, 1001 genera, 4079 species and 806 "varieties, named forms, &c." It remains to be said that the get-up of the book is in every way satisfactory: it is well printed on good paper and strongly bound.

Mesembrianthemum und Portulacaceen. Beschreibung und Anleitung zum Bestimmen der wichtigsten Arten, mit kurzen Angaben über die Kultur. Von Alwin Berger. Mit 67 Abbildungen. 8vo, pp. 328, limp cloth. Price 5 Marks. Ulmer, Stuttgart.

This is a very handy and useful addition to the series of "Illustrierte Handbücher sukkulenter Pflanzen" which is being issued by Herr Ulmer. There was certainly room for a monograph of *Mesembryanthemum*—a genus which, as Haworth's publications show, was greatly in vogue among cultivators more than a hundred years ago, but has since fallen into somewhat unmerited neglect. Mr. Berger has given us a very complete account of the genus as at present known; he has evidently carefully collated the literature of the subject, for we note that he reproduces part of Masson's drawings of *Mesembryanthemum ciliatum* and *M. digitatum*, to which reference was made in this Journal for 1884 (p. 147). A careful clavis of sections and genera is followed by descriptions of the species, many of which are figured. He

describes 315 species as against 293 described by Sonder in the *Flora Capensis* in 1862: this however affords only a general basis for comparison, as the limits of species are differently understood by the authors, but it is noteworthy how very large a proportion of those maintained were established by Haworth. Seven species are described as new—*M. ochraceum*, *M. Rehnellianum*, *M. vespertinum*, *M. Hookeri* (*M. truncutellum* Hook. fil. in Bot. Mag. t. 6077, non Haw.), *M. Wettsteinii*, *M. calculus*, *M. pseudo-truncutellum*: *M. linguiforme* L. is extended to cover a wide range of forms originally described as species, eleven of which are maintained as varieties.

The *Portulacaceæ* occupy but small space; fifteen, of which two are new, are included under *Anacampseros*; the other genera are *Portulacaria*, *Calandrinia*, *Lewisia*, and *Portulaca*.

The book is admirably printed, and will prove invaluable to those who read German, in which it is written; the illustrations are very useful.

Grundlagen und Ergebnisse der Pflanzenchemie. Nach der Schwedischen Ausgabe. By H. Euler. Erster Teil. Das Chemische Material der Pflanzen. Mit einer Abbildung im Text. Pp. 238. Braunschweig: Friedrich Vieweg und Sohn. 1908. 6 Marks.

The great development which botanical science has undergone during the past five-and-twenty years, however interesting it may have been from many points of view, has been attended with a certain inconvenience to the student. The immense amount of research which has marked the period has led to the publication of a great flood of literature, and papers of varying importance have appeared in a vast number of journals in different countries. The duty of putting together the substance of these papers has been realized as a very pressing one, and little by little most of it has been discharged by the publication of works on anatomy, physiology, and other branches of the science. One branch, however, has been almost neglected; akin to vegetable physiology on the one hand, and to organic chemistry on the other, the biochemistry of the plant has attracted neither, and till recently any information required had to be sought for in the original memoirs. To a large extent this was remedied by the appearance a few years ago of Professor Ctzapek's great work, but the almost encyclopædic nature of this put it out of the reach of many. It is therefore a matter of great interest to find that Dr. H. Euler, of the University of Stockholm, has in preparation a smaller work on the subject, of which the *Grundlagen* is the first volume.

In this he has put together, in a somewhat condensed form perhaps, the chemical characteristics of the constituents of the body of the plant. He has treated of them under three principal heads, noticing the non-nitrogenous compounds of the fatty and of the aromatic series, and subsequently the nitrogenous substances.

On the whole he has done the work well, in spite of the great difficulties attending compression. He has set before him the object of producing a book which shall be readable and reliable, presenting

especially the chemical side of vegetable metabolism, and bringing out the constitution of the substances which exists in plants.

The treatment of the proteids may be regarded perhaps as the least satisfactory from the botanist's standpoint. Only some eleven pages out of two hundred are devoted to this section. Recent work on the products of their decomposition, especially that of Fischer and his pupils, has, however, been fairly described.

The first volume must of course be regarded as only introductory to the second so far as the botanical student is concerned. In the second volume, which Dr. Euler promises without prolonged delay, the subject will be treated more broadly, and from a different point of view. In it he proposes to discuss the physico-chemical laws, whose operations can be traced in the plant, and finally to co-ordinate all with the biological results which have been obtained by the vegetable physiologists. The whole work should form a very valuable contribution to scientific literature.

J. R. G.

Guide to Sowerby's Models of British Fungi in the Department of Botany, British Museum (Natural History). By Worthington George Smith, F.L.S. Second Edition, revised. 8vo, pp. 85, 91 figs. in text. Price 4*d*.

An editorial note informs us that "the first edition of this Guide was issued in 1893 and was reprinted without alteration in 1898. The present edition has been carefully revised with the assistance of the author, and a glossary has been added." The large and continued demand for this little work is sufficient testimony to its value. It is much more than a guide to a series of models; it is at once the simplest and most comprehensive introduction to the field-study of the larger British fungi published in this country. British botanists have lagged far behind their continental brethren in their appreciation of this difficult branch of botany, and it is to the life-long labour of Mr. W. G. Smith and a few other devoted mycologists that we owe our present advanced knowledge of British forms. The Guide is strictly confined to species represented by models, but these are all more or less familiar fungi. The *Agaricaceæ* receive most attention, as it is in that family that mistakes may be made between edible and poisonous plants. Too high value has perhaps been placed on the mushroom as an esculent; though it is highly nitrogenous, recent research has shown that the nitrogen it contains exists in a condition that is not available for food. Many genera have necessarily been omitted, but their place is indicated in the scheme of classification. *Boletus edulis* and *Fistulina hepatica* are the only members of the *Polyporaceæ* that are used as esculents in this country, and the properties of these and of all our edible forms are plainly set forth. The models were intended by Sowerby to instruct the public in the choice of what was suitable for food among fungi, and the Guide prepared by Mr. Smith, illustrated as it is by excellent figures, carries the intention still further. A glossary of technical terms adds to the value of this edition.

The only drawback to the general usefulness of the Museum Guides is the difficulty of obtaining them, as they are not procurable through the trade. It may therefore be useful to say that a copy of the Guide in question will be forwarded by post if application be made, enclosing 6*d*. in stamps, to the Keeper of the Department of Botany, British Museum (Nat. Hist.), Cromwell Road, S.W.

A. L. S.

BOOK-NOTES, NEWS, &c.

At the first meeting of the Linnean Society for the present session on 5th November, there was little of general and less of botanical interest. Dr. Otto Stapf referred to Mr. Scott Elliot's problematical plant, described and discussed in Journ. Linn. Soc. Bot. xxx. p. 155, t. 8, which has been identified by M. H. Hua with his *Lepidagathis Pobeguinii*. He produced one of Scott Elliot's specimens, and explained how from the presence of cystoliths in the epidermis in connection with the peculiar distribution of the phloëm in the stem the affinity of the plant might have been ascertained in spite of the absence of inflorescences.

Dr. August von Hayek, of Vienna University, has begun the publication of a flora of Styria (*Flora von Steiermark*. Berlin: Borntraeger. 1908. Heft 1, 80 pp. Price 3 Marks), which will be completed in about eighteen parts, filling two volumes, and consisting of about 1400 pages. It will be a systematic treatment of the ferns and flowering plants of the province, and a description of the geographical relations of the flora. The present part consists almost entirely of an account of the ferns and fern allies, the study of which is facilitated by a series of clearly constructed keys. The descriptions (in German) are concise; synonymy and citation of literature are sufficiently fully treated; and the habitat and the distribution of the species have been prepared with care. Some of the groups are illustrated with text-figures. The situation of Styria between the Alps the Carpathians and Illyria should be productive of many interesting problems of distribution, when the part of the work devoted to plant-geography is reached.

A few copies of the Third Supplement to the *Biographical Index of British and Irish Botanists* which was issued with our last number may be obtained separately from the publishers, price 1*s*. 6*d*. each. The First and Second Supplements may still be obtained at the same price. The *Index* itself—which is practically a different work from the form in which it first appeared in this Journal—with the two Supplements costs (in cloth) 9*s*. 6*d*. net.

We are sorry to learn that the *Bulletin de l'Herbier Boissier* will cease publication with the December number. Since its first appearance in 1893 the *Bulletin* has conserved a high standard of usefulness, and its cessation will be regretted by all systematists.

We regret to announce the death of the Rev. R. P. Murray, of whom we hope to publish some account in our next issue.

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CORRIGENDA.

P. 28, ll. 15, 16, omit "although," &c.
P. 38, l. 3 from top, *Pentanisia spicata* = *Otiophora scabra*: see p. 76.
P. 118, l. 7 from top, for "Fückel" read Fuckel.
P. 119 l. 19 from bottom, for "Lackney M. Harsh" read "L. Hackney Marsh." Paddington (l. 17) is not in Middlesex: see p. 199.
P. 216, l. 7 from bottom, for "Christania" read Christiania.
P. 221. See note on p. 395.
P. 238, l. 19 from top, for "e. g." read cf.
P. 292, l. 24 from bottom, for "*Veronnia*" read *Vernonia*.
P. 319, l. 12 from bottom, for "*gimceum*" read *junceum*.

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This Third Supplement contains records of botanists whose deaths have been recorded in 1903–1907 inclusive, together with some others which should have found a place in the *Index* or in its Supplements.

It is in contemplation to publish, though not immediately, a revision of the original work, in which the three Supplements will be incorporated. The compilers will therefore be grateful for any additions or corrections, either to the *Index* or to its Supplements.

Aitken, Andrew Peebles (d. 1904): b. Edinburgh; d. Murrayfield, Edinburgh, 17 April, 1904. M.A. Edinb. 1867, D.Sc. Edinb. 1873. Prof. Chemistry R. Veterinary College, Edinburgh. F.B.S. Ed. 1871, President, 1895–7. F.R.S. Ed. Papers in Trans. Bot. Soc. Ed. R.S.C. ix. 21. Trans. Bot. Soc. Ed. xxiii. 47.

Arnold, Rev. Frederick Henry (1831–1906): b. Petworth, Sussex, 18 Feb. 1831; d. Emsworth, Sussex, 4 May, 1906. B.A. Trin. Coll. Dublin, 1859; LL.D. 1892. 'Flora of Sussex,' 1887; ed. 2 (posthumous), 1907. Journ. Bot. 1906, 135, 287; 1907, 287.

Bain, John (1815–1903): b. Ireland, 9 May, 1815; d. Holyhead, 28 April, 1903; bur. Mt. Jerome Cemetery, Dublin. Curator of Trin. Coll. Bot. Garden, Dublin, 1862–78. A.L.S. 1863. Discovered *Hordeum sylvaticum* in Ireland, Proc. Dubl. Nat. Soc. i. 45. Proc. Linn. Soc. 1902–3, 26. Gard. Chron. 1903, i. 299. Portr. in 'Garden,' vol. 35, 26 June, 1889.

Barker, Thomas (1838–1907): b. Aberdeen, 9 Sept. 1838; d. Buxton, 20 Nov. 1907. Educated Aberdeen and Cambridge. M.A. Cantab. 1862. Prof. Mathematics, Owens Coll., Manchester, 1865–85. Bryologist. Referee, Moss Exch. Club. Founded Cryptogamic Chair at Victoria University. Herbarium, including Whitehead's mosses, at Victoria University, Manchester. Journ. Bot. 1897, 91.

Baron, Rev. Richard (1847–1907): b. Kendal, Westmorland, 8 Sept. 1847; d. Morecambe, Lancashire, 12 October, 1907; bur. Kendal. Missionary in Madagascar, 1872–1907. F.L.S.

1882. Sent 7000 specimens, including 1000 new spp., to Kew, described by J. G. Baker, Journ. Linn. Soc. xx. xxv., &c. Kew Bulletin, 1908, 45. Quart. Journ. Geol. Soc. lxiv. p. lxiv. Proc. Linn. Soc. 1907–8, 44. *Baronia* Baker.

Batters, Edward Arthur Lionel (1860–1907) : b. Enfield, Middlesex, 26 Dec. 1860 ; d. Gerrard's Cross, Bucks, 11 Aug. 1907. B.A. and LL.B. Camb. 1882 ; F.L.S. 1883. Algologist. Herb. of 10,000 British and 3000 exotic algæ, including those of Mrs. Merrifield and J. H. Pollexfen, with 3000 micro.-slides, in Brit. Mus. R.S.C. ix. 141. Journ. Bot. 1907, 385, portr. Proc. Linn. Soc. 1907–8, 45. *Battersia* Reinke.

Bell, Rev. Edward (1829–1904) : b. Uppingham, Rutland, 26 Jan. 1829 ; d. Poole, Dorset, 5 March, 1904. B.A. Camb. 1858, M.A. 1866. Vicar, St. John's, Wakefield, 1868–90. 'The Primrose and Darwinism,' 1902. Journ. Bot. 1904, 159.

Benson, Richard de Gylpyn (1856–1904) : b. Church Pulverbatch, Salop, 25 June, 1856 ; d. same place 24 Feb. 1904. Solicitor. Bryologist. Shropshire mosses in National Herbarium. Journ. Bot. 1904, 128.

Bidgood, John (1853–1905) : b. 1853 ; d. Bournemouth, Hants, 6 Oct. 1905 ; bur. Gateshead-upon-Tyne. F.L.S. 1889. B.Sc. Lond. Headmaster Gateshead Secondary School. 'Textbook of Biology,' 1893. 'Colour in Flowers,' Journ. R. Hort. Soc. xxix. 463. Journ. R. Hort. Soc. xxxi. 189, with portr. Proc. Linn. Soc. 1905–6, 32. Gard. Chron. 1905, ii. 287. *Glæosporium Bidgoodii* Cooke.

Bissett, James Petrie (1839–1906) : b. Inverurie, Aberdeensh. 1839 ; d. Banchovy-Ternan, Deeside, 17 April, 1906. Desmidiologist. 'Notes on Japanese Desmids' (with J. Roy) in Journ. Bot. 1886 ; Scottish Desmids in Ann. Scott. Nat. Hist. 1893–4. Ann. Sc. Nat. Hist. 1906, 187 ; Gard. Chron. 1906, i. 272. *Cosmarium Bissettii* W. B. Turn.

Bossey, Francis (1809–1904) : b. Sutton-at-Hove, Kent, 4 Oct. 1809 ; d. Redhill, Surrey, 27 Sept. 1904 ; bur. Sutton-at-Hone. M.D. Glasgow. Practised at Woolwich till 1867. 'Fungi which attack Cereals,' Proc. Bot. Soc. Lond. 50. 'Kent Plants,' Ann. & Mag. Nat. Hist. ii. (1839), 272. Contrib. to Gibson's Fl. of Essex. Journ. Bot. 1904, 358.

Bowring, John Charles (1821–93) : son of Sir John Bowring. Collected ferns, mosses, and flowering plants of Hongkong from 1852. Coleopterist. 'Rice-paper,' Trans. China Branch R.A.S. 1852, 37. Hance, Add. Fl. Hongk. 144. Journ. Bot. 1852, 75. Bretschneider, 381. *Bowringia* Champ.

Brandis, Sir Dietrich (1824–1907) : b. Bonn, 31 March, 1824 ; d. Bonn, 28 May, 1907. At Universities of Copenhagen, Gottingen, and Bonn. F.L.S. 1860. Knighted 1887. Superintendent of Forests, Pegu, 1856 ; Inspector-General of Indian Forests, 1864–83. 'Forest Flora of India,' 1876. R.S.C. vii. 242. Jacks. 526. Journ. Bot. 1907, 288. Gard. Chron. 1907, i. 376. Proc. Linn. Soc. 1907–8, 46. *Brandisia* Hook. f. & Thoms.

Brebner, George (1855?–1904): b. Aberdeen, 1855?; d. Bristol, 23 Dec. 1904. Lect. on Bot., University College, Bristol. Cytologist, algologist, and draughtsman. Pupil and collaborator of Dr. D. H. Scott. Illustrated 'Plants of Coal-measures,' Phil. Trans. 1894–5. Journ. Bot. 1905, 60. *Rhodochorton Brebneri* Batters.

Brightwen, Eliza, *née* Elder (1830–1906): b. Banff, 30 Oct. 1830; d. Stanmore, Middlesex, 5 May, 1906; bur. Stanmore. 'Glimpses into Plant Life.' Gard. Chron. 1906, i. 303. Nature Notes, 1906, 113. Journ. Bot. 1906, 216. 'Life and Thoughts of a Naturalist,' by W. H. Chesson, with portr. (forthcoming).

Bromwich, Henry (1828–1907): b. Warwick, 10 March, 1828; d. Milverton, Warwick, 28 May, 1907. Gardener. Helped in 'Fl. Warwicksh.' Herbarium in Warwick Museum. Report Bot. Exch. Club, 1907, 262. Journ. Bot. 1908, 304.

Brown, John Ednie (1848?–1900): b. Scotland, 1848?; d. W. Australia, 1900. Son of Dr. James Brown, author of 'The Forester.' F.L.S. 1879. Papers in Highland Soc. Trans. 1871–5. Visited Canada and U.S.A. 1871–2. 'Trees found in Canadian Forests,' Trans. Scot. Arbor. Soc. Conservator of Forests, South Australia, 1878; West Australia, 1895. 'Forest Flora of S. Australia,' 1882. R.S.C. vii. 279; ix. 371. 'Notable South Australians,' 1885.

Brown. Robert (1824?–1906): b. 1824?; d. St. Albans, near Christchurch, New Zealand, 13 Dec. 1906. Shoemaker and bryologist. Described and figured many new spp. of mosses in Trans. N. Z. Institute, fr. 1892. Journ. Bot. 1907, 126.

Buchanan, John (d. 1898): d. New Zealand, 1898. In New Zealand from 1859. Draughtsman and Bot. to Geol. Survey, Otago, 1862; to Geol. Survey, N.Z., 1866. 'Bot. of Otago,' Trans. N.Z. Institute, i. (1868). 'Grasses of N.Z.' 1880. Contrib. to Trans. N.Z. Institute. Pl. at Kew Herbarium, at Colonial Museum; MSS., drawings, and pl. at Otago University Museum. Journ. Bot. 1869, 331. Jacks. 403. Cheeseman, 'Manual N.Z. Flora,' xxvii.–xxviii. R.S.C. vii. 291; ix. 385. *Ranunculus Buchanani* Hook. fil.

Bunbury, Louisa Emily, *née* Fox (d. 1828): d. Nervi, Italy, 15 Sept. 1828. Married, 1807, Col. (afterwards Sir) Henry Bunbury. Mother of Sir C. J. F. Bunbury. Knew British and other plants, and had a herbarium. 'Life of Sir C. J. F. Bunbury' (1906), i. 45.

Burbidge, Frederick William (1847–1905): b. Wymeswold, Leicestersh., 21 March, 1847; d. Dublin, 24 Dec. 1905. Hon. M.A. Dublin, 1889. Gardener at Kew; to Borneo, 1877–8; Curator Trin. Coll. Garden, Dublin, 1879, till death. Drew plants well. 'Art of Botanical Drawing,' 1873; 'The Narcissus,' 1875; 'Gardens of the Sun,' 1880. Journ. Bot. 1906, 80; Kew Bull. 1906, 71: Journ. Kew Guild, 1905, 269; Jacks. 528. R.S.C. ix. 1906, 326 (portr.). Gard. Chron. 1905, ii. 460; 1906, i. 10 (portr.). Hort. Veitch. 75, 399. *Burbidgea* Hook. f.

Burgess, Joseph Tom (1828–86): b. Cheshunt, Herts, 17 Feb. 1828; d. Leamington, 4 Oct. 1886. F.S.A. Newspaper editor. 'English Wild Flowers,' 1868. Dict. Nat. Biogr. Suppl. i. 335. Jacks. 237.

Christy, Thomas (1832–1905): b. 9 Dec. 1832; d. Wallington, Surrey, 7 Sept. 1905; bur. Wallington. F.L.S. 1876. In China, 1853–6. 'Forage Plants,' 1877. 'New Commercial Plants,' 1878–97. Jacks. 196. Proc. Linn. Soc. 1905–6, p. 36.

Churchill, George Cheetham (1822–1906): b. Nottingham, 25 Sept. 1822; d. Clifton, 11 Oct. 1906. Solicitor in Manchester, 1853–63; to Clifton, 1869. Travelled in Dolomites, 1860–63; 'The Dolomite Mountains' (with Josiah Gilbert). Herbarium bequeathed to Kew. R.S.C. vii. 390. Journ. Bot. 1907, 40. Kew Bull. 1906, 384.

Clarke, Charles Baron (1832–1906): b. Andover, Hants, 17 June, 1832; d. Kew, 25 Aug. 1906. Nephew of Joshua, Joseph, and Benjamin Clarke. F.L.S. 1867; F.R.S. 1882. 'List of Plants of Andover,' Calcutta, 1866. 'Commelynaceæ . . . Bengalenses,' 1874. 'Compositæ Indicæ,' 1876. R.S.C. vii. 395; ix. 526. Gard. Chron. 1906, ii. 164. Journ. Bot. 1906, 370 (portrait). Kew Bull. 1906, 271 (bibliogr.). Proc. Linn. Soc. 1906–7, 38. Jacks. 532. *Clarkella* Hook. f.

Crombie, Rev. James Morrison (1830?–1906): b. Aberdeen, 20 April, 1830?; d. Ewhurst, Surrey, 12 May, 1906. M.A. Edinb. F.L.S. 1868. Lecturer on Bot. St. Mary's Hospital, 1879–91. 'Braemar Nat. Hist.,' 1861. 'Lichenes britannici,' 1871. 'New British Lichens,' Journ. Bot. 1869. 'Monograph of the Lichens found in Britain,' 1894. Herb. in Mus. Brit. R.S.C. vii. 461; ix. 605. Jacks. 536. Journ. Bot. 1906, 248. Proc. Linn. Soc. 1905-6, 36. *Lecidea Crombiei* Jones.

Day, John (1824–88): b. London, 3 Feb. 1824; d. Tottenham, 15 Jan. 1888. Cultivated ferns and orchids. Visited India, Ceylon, Brazil, and Jamaica. Collection of 3000 coloured drawings of orchids at Kew. Kew Bulletin, 1906, 177.

Dewar, Daniel (1860?–1905): b. Perthshire, 1860?; d. New York, 7 May, 1905. At Kew, 1880–93. Curator Bot. Gard., Glasgow, 1893–1902. Contributed monographs of herbaceous genera to 'Garden.' Edited Johnson's 'Gardeners' Dictionary' with C. H. Wright. Journ. Kew Guild ii. 266 (portr.).

Dick, James (d. 1775). Pupil of Haller; friend of N. J. Jacquin. Herbarium purchased by Banks, now in Herb. Mus. Brit. Jacq. Hort. Vindob. iii. 12. Journ. Bot. 1902, 389; 1904, 358.

Dieffenbach, Ernest (fl. 1820–43). M.D. Naturalist to New Zealand Co. 1839–41. 'Travels in N. Z.' 2 vols. 1843 [Botany, vol. i. pp. 419–431]. Pl. at Kew. Cheeseman, Manual of N. Z. Flora, xxi. Jacks. 403. *Aciphylla Dieffenbachii* Kirk.

Dominy, John (1816–91): b. Gittisham, Devon, 1816; d. Chelsea, 12 Feb. 1891; bur. Exeter. Hybridist; w. Messrs. Veitch from 1834. Gard. Chron. 1891, i. 278, portr.; Garden, xxi. portr., xxxix. 179. × *Cypripedium Dominii*.

Duff, Sir Mountstuart Elphinstone Grant (1829–1906): b. Eden, Aberdeen, 21 Feb. 1829; d. 12 Jan. 1906. M.A. Oxon. 1853. M.P. 1857–1881. Governor of Madras, 1881–6. F.L.S. 1872. F.R.S. 1881. Pres. R.G.S. 1889–93. Grandson of Sir Whitelaw Ainslie. Knew Brit. pl. well. R.S.C. vii. 566. Journ Bot. 1906, 79. Proc. Linn. Soc. 1905–6., 37. Portr. Vanity Fair, 1869, by Ape; Ill. London News, 1881. *Iris Grant-Duffii* Baker.

[**Dyson, David** (1823–56): b. Oldham, Lancs. April, 1823; d. Rusholme, Manchester, 10 Dec. 1856. Mill-operative. Collected birds in Honduras and Venezuela; but did not send plants to the British Museum as stated in Proc. Manchester Field Club, i. pt. 2, w. portr. Journ. Bot. 1905, 134.]

Farmar, Leo (1875?–1907): b. 1875? d. Southsea, Hants. 6 April, 1907. Employed in Kew Herbarium, 1903–5: to West Africa, 1906; in Kew Herbarium, 1907. Journ. Kew Guild ii. 381 (portr.). Gard. Chron. 1907, i. 243.

Farquhar, W. (fl. 1815–22): Colonel. First Resident of Singapore. Collected on Mount Ophir. Correspondent of Wallich. *Myristica Farquhariana* Wall.

Farquharson, Rev. James (d. 1906): d. Selkirk, 25 April, 1906. D.D. Minister of Selkirk. 'Plants of Selkirk,' in Hist. Berwick. Nat. Club viii. 77. R.S.C. vii. 639; ix. 830. Trans. Bot. Soc. Ed. xxiii. 216.

Farrar, John (1849–1907): b. Harrogate, 28 May, 1849: d. Harrogate, 13 Nov. 1907. Botanical papers in 'Naturalist.' F.L.S. 1896. Proc. Linn. Soc. 1907–8, 48.

Farrer, William James (1845–1906): b. Kendal, Westmorland, 1845; d. Lambrigg, N.S.W., 1906. B.A. Camb. 1868. Surveyor to Lands Department, N.S.W., 1870–86. Wheat experimentalist, 1898. Improved wheat by cross-breeding and selection. Kew Bulletin, 1906, 226.

Fergusson, Rev. John (1834–1907): b. 1834, Kerrow, Glen Shee, Forfarshire; d. Edinburgh, 6 Aug., 1907. LL.D. St. Andrews, 1896. Bryologist. R.S.C. vii. 652; ix. 348; xii. 235. Journ. Bot. 1908, 31.

Finlay, Kirkman (fl. 1820–84). M.D. Practised in Trinidad. Collected also in Antigua, Dominica, and Grenada. Plants at Trinidad Bot. Gard. and Kew. R.S.C. ii. 613. Ann. Rep. Trinidad Garden, 1887, 11; Symbol. Antill. iii. 48.

Foster, Sir Michael (1836–1907): b. Huntingdon, 8 March, 1836; d. London, 29 Jan. 1907. M.B. Lond. 1859. M.D. 1859. F.L.S. 1868. F.R.S. 1872. K.C.B. 1899. M.P. 1900–6. Fullerian Prof. Physiol. 1869. Prof. Physiol. Camb., 1883. Student of *Iris*; papers in Gard. Chron. 1899–1902, and 'Garden.' R.S.C. ii. 674; vii. 602; ix. 906; xii. 246. Kew Bulletin, 1907, 66; Proc. Linn. Soc. 1906–7, 42; Gard. Chron. 1907, 78, portr. Portr. Ill. London News, 1899, 830; 1900, 253; Pop. Sci. Monthly, 1899, 14.

Fox, Edwin Fydell (1814–91): b. Brislington, Bristol, 20 April,

1814; d. Brislington, 12 March, 1891; bur. Brislington. Surgeon. Collected varieties of, and hybridized, British ferns. Lowe, 'Fern-Growing,' 177, with portr.

Fraser, Hugh (1834 ?–1904): b. 1834 ?; d. Edinburgh, 13 Jan. 1904. F.B.S. Ed. 'Handy Book of Ornamental Conifers, &c.,' 1875. Gard. Chron. 1904, i. 60.

Fraser, Patrick Neill (1830–1905): b. Edinburgh, Aug. 1830; d. Murrayfield, Edinburgh, 27 Feb. 1905; bur. Dean Cemetery, Edinburgh. F.R.S. Ed. Pteridologist. Fern Herbarium at Royal Bot. Garden, Edinb. 'Brit. Ferns and their Varieties,' 1864. Jacks. 503. Trans. Bot. Soc. Ed. xxiii. 208. Gard. Chron. 1905, i. 157.

Garnsey, Rev. Henry Edward Fowler (1826–1903): b. Coleford, Glos., 1826; d. Bath, June, 1903; bur. Abbey Cemetery, Bath. B.A. Oxon, 1846; Senior Fellow of Magdalen College. Transl. Sachs's Hist. of Botany (1890) and other German botanical works. Helped in Fl. Berks (p. viii). Portr. by Mrs. Longman in Magdalen Coll. Journ. Bot. 1903, 318. Rep. Ashmolean Nat. Hist. Soc. 1903, 26.

Glasson, William Arthur (1828–1903): b. Hayle, Cornwall, 29 May, 1828; d. Lescudjack, near Penzance, 14 Jan. 1903. 'Foreign Plants in W. Cornwall,' Trans. Penzance N. Hist. Soc. 1888–9, 62. Journ. Bot. 1903, 111.

Gough, George Stephens, 2nd Viscount (1815–95): b. 13 Jan. 1815; d. Booterstown, Dublin, 31 May, 1895. Captain, Grenadier Guards. B.A. Dublin, 1836. M.A. 1840. F.L.S. 1840. Collected in Neilgherries with Munro, 1842. Had a herbarium. Proc. Linn. Soc. 1895-6, 36. Wight Ic. v. pt. 2, 22. Portr. Ill. London News, 1895, 734. *Goughia* Wight= *Daphniphyllum*.

Grant, Alexander (1848–1906): b. Cullen, Banffsh., 1848; d. Sydney, 25 Dec. 1906. Employed in Bot. Gard. Edinburgh. In Bot. Gard. Sydney from 1882. Mycologist for Sydney Dept. of Agriculture. Rept. Sydney Bot. Gardens for 1906, 11.

Grindon, Leopold Hartley (1818–1904): b. Bristol, 28 March, 1818; d. Greenheys, Manchester, 20 Nov. 1904; bur. Manchester Southern Cemetery. Chief founder (1860) and president of Manchester Field Naturalists' Soc. 'Manchester Flora,' 1859; 'Shakespeare Flora,' 1883. R.S.C. vii. 841. Jacks. 553. Journ. Bot. 1905, 30. Gard. Chron. 1904, ii. 373, 393.

Hanbury, Sir Thomas (1832–1907): b. Clapham, Surrey, 21 June, 1832; d. La Mortola, Italy, 9 March, 1907; bur. San Remo. K.C.V.O. 1901. Brother of Daniel Hanbury. Had botanical garden at La Mortola from 1867. Founded Bot. Institute of Genoa, 1892, and presented Wisley garden to R. Hort. Soc., 1903. Journ. Bot. 1907, 216. Kew Bull. 1907, 132. Gard. Chron. 1907, i. 172 (portr.). Proc. Linn. Soc. 1906–7, 46.

Haviland, George Darby (1857–1901?): b. Warbleton, Sussex, 19 Nov. 1857; d. Natal, 1901? F.L.S. 1894. B.A. Cantab. 1880. M.B. Cantab. Medical Officer to Sarawak Government, 1891; Curator Kuching Museum, 1893–5; collected in Borneo. Plants at Kew, &c. 'Revision of Naucleæ,' Journ. Linn. Soc. Bot. xxxiii. (1897). Kew Bulletin, 1907, 197. *Havilandia* Stapf.

Hector, Sir James (1834–1907): b. Edinburgh, 16 March, 1834; d. Wellington, New Zealand, 6 Nov. 1907. M.D. Edinb. 1856. F.R.S. 1866. F.L.S. 1875. K.C.M.G. 1887. Naturalist to Expedition to Brit. N. America, 1857. Gov. Geologist, New Zealand, 1861. First Director, Geol. Survey, N. Z., 1865–1903. 'Physical Features Brit. N. America,' 1861. 'Geogr. Bot. of N. Z.' Trans. N. Z. Institute, 1868. Plants in Brit. Mus. and at Kew. Quart. Journ. Geol. Soc. lxiv. p. lxi. Cheeseman, 'Man. N. Z. Flora,' xxviii. 'Nature,' 14 Nov. 1897, p. 37. Jacks. 366. R. S. C. iii. 246; vii. 932; x. 174. Proc. Linn. Soc. 1907–8, 50. *Hectorella* Hook. f.

Hill, Walter (1820–1904): b. Scotsdyke, Dumfries, N.B., 31 Dec. 1820; d. Canonbie Lea, Brisbane, Queensland, 4 Feb. 1904. At Edinburgh Garden under W. McNab. At Kew, 1843–51. First Superintendent Bot. Garden, Brisbane, 1855–81. Colonial Botanist and Director of Bot. Gard., Queensland. R.S.C. xii. 334. Journ. Kew Guild, 1904, 206, with portr. Gard. Chron. 1904, i. 190. *Musa Hillii* F. Muell.

Hogg, Jabez (1817–99): b. Chatham, Kent, 4 April, 1817; d. Kensington, 23 April, 1899; bur. Kensal Green. Ophthalmic Surgeon. F.R.M.S. F.L.S. 1866. 'The Microscope,' 1854; ed. 7, 1869. 'Vegetable Parasites,' 1866. Jacks. 165. R.S.C. iii. 399; vii. 1003; x. 255. Dict. Nat. Biogr. Supp. 2, 432. Portr. Ill. London News, 1899, 604.

Hope, Charles William Webley (1832–1904): b. Edinburgh, 1832; d. Kew, 18 Feb. 1904. Civil Engineer. Pteridologist. To India, 1859; collected in Kumaon (1861), Simla (1871), and Western Himalayas; returned to England (Kew), 1896. 'Ferns of N.-W. India' in Journ. Bombay N. Hist. Soc. 1899–1903. Herbarium in Herb. Mus. Brit. Journ. Bot. 1904, 127.

Horne, John (1835–1905): b. Lethendy, Perthsh., Jan. 1835; d. St. Clements, Jersey, 16 April, 1905. At Kew, 1859-60; at Bot. Gard. Mauritius, 1861–90 (Director from 1877). To Fiji Islands, 1877. 'A Year in Fiji' (1881). F.L.S. 1873. Plants at Kew. R.S.C. vii. 1017; x. 274. Journ. Bot. 1905, 192. Journ. Kew Guild, 1905, 266 (portr.). Proc. Linn. Soc. 1904–5, 34. Trans. Bot. Soc. Ed. xxiii. 214. *Ipomœa Hornei* Baker.

Jennings, Alfred Vaughan (1864–1903): b. Hampstead, 1864; d. Christiania, 11 Jan. 1903. Demonstrator in Bot. and Geol. Dublin R. Coll. Science, 1895–8. F.L.S. 1888. Collected in New Zealand. '*Tmesipteris*' in Proc. R. I. Acad. 1891.

'*Astrobacter*,' Proc. R. I. A. ser. iii. vol. v. 312 (1899). Proc. Linn. Soc. 1902–3, 31, with bibliogr. New Phytol. 1903, 65. Quart. Journ. Geol. Soc. 1903, lv.

Johnson, Christopher (d. 1866): d. Lancaster, June, 1866. Of Lancaster. Diatomist. Correspondent of Walker Arnott. Bequeathed 2000–3000 slides to Rylands. Slides in Rylands Coll. in Mus. Brit. Journ. Bot. 1907, 455.

Joshua, William (1828–98): b. London, 13 Aug. 1828; d. Cheltenham, 18 Jan. 1898. F.L.S. 1877. Lichenologist. Papers on *Desmidieæ* in Journ. Bot. 1882–3. Herbarium and microscopic preparations purchased by Brit. Mus. R.S.C. x. 358.

Justen, Frederick (1832–1906): b. Bonn, 29 Feb. 1832; d. Soho, London, 15 Dec. 1906. Bookseller; executor of F. Welwitsch; well acquainted with botanical literature. F.L.S. 1886. Journ. Bot. 1907, 62 (portr.). *Justenia* Hiern.

Keith, Rev. James (1825–1905): b. Keith, 23 Dec. 1825; d. Forres, Aberdeensh., 11 Aug. 1905. M.A. Aberdeen, 1845. LL.D. Aberdeen, 1882. Minister of Forres. Mycologist. Papers on fungi and mosses in Scott. Naturalist. R.S.C. viii. 58; x. 360. Ann. Scott. Nat. Hist. 1905, 194 (portr.). Journ. Bot. 1905, 334. *Peziza Keithii* Phill.

Lamb, Henry (1858–1905): b. Maidstone, Kent, April, 1858; d. Maidstone, 15 July, 1905; bur. Maidstone Cemetery. 'Flora of Maidstone,' 1899. 'Flora of North Downs' in 'Science Gossip.' Pl. in Maidstone Museum. Journ. Bot. 1905, 280.

Laslett, Thomas (1811–87): b. Chatham, 18 June, 1811; d. Old Charlton, Kent, 6 April, 1887. In Admiralty timber-yard at Chatham. 'Timber and Timber-Trees,' 1875; ed. 2, by H. M. Ward, 1894.

Leefe, Rev. John Ewbank (d. 1889): d. Redcar, Yorks. 1889. B.A. Camb., 1835. Incumbent of Cresswell, Northumb., 1849–87; formerly of Audley End, Essex (1841) and Bishop-Wearmouth. Salicetist. Arranged *Salix* in Lond. Cat. ed. i. (1844) and in Steele's 'Handbook,' 1851. Papers on *Salix* in Trans. B.S. Ed. i. (1841) and Journ. Bot. 1870–72. Issued 'Salictum Britannicum' (specimens) 1844?–74. R.S.C. iii., 925; viii. 188.

Low, Sir Hugh (1824–1905): b. Clapton, London, 10 May, 1824; d. Alassio, 18 April, 1905. To Borneo, 1840. Ascended Kina Bulu, 1851. British Resident in Perak, 1877–87. K.C.M.G. 1883; G.C.M.G. 1889. F.L.S. 1894. 'Sarawak,' 1848. Journ. Bot. 1905, 192. Orchid Rev. 1905, 182. Proc. Linn. Soc. 1904–5, 39. Gard. Chron. 1905, i. 264. *Nepenthes Lowii*, Hook. f.

Luehmann, John George (1843–1904): b. 1843; d. Victoria, 18 Nov. 1904. F.L.S. 1885. To Victoria, 1862: secretary to F. v. Mueller, 1867: Curator National Herbarium, Melbourne, 1896; Government Botanist. Helped F. v. Mueller in 'Key to Syst. Victorian Plants' (1887–8), 'Key to Eucalyptus,' 1898. Proc. Linn. Soc. 1904–5, 43.

Lunt, William (d. 1904): d. St. Kitts, West Indies, 3 Jan. 1904. Gardener at Kew. In Hadramaut with Theodore Bent, 1893. Discovered two new genera. Assist. Superintendent Trinidad Bot. Gard. Curator Bot. Station, St. Kitts-Nevis. Pl. at Kew and Brit. Mus. Kew Bulletin 1894, 328. Journ. Kew Guild, 1904, 208–9, with portr. *Verbascum Luntii* Baker.

Lynch, Thomas Kerr (1818–91): b. Partry, Ballinrobe, co. Mayo, 1818; d. London, 27 Dec. 1891. Mesopotamian explorer. On second Euphrates expedition, 1837–42; collected in N. Persia, 1849. Plants in Mus. Brit. Dict. Nat. Biogr. xxxiv. 338.

Lyons, John Charles (1792–1874): b. Ladistown, co. Westmeath, 22 Aug. 1792; d. same place 3 Sept. 1874; bur. Mullingar. 'Orchidaceous Plants,' 1843, ed. 2, 1845. Imported and grew orchids. Pritz, 199; Jacks. 576. Dict. Nat. Biogr. xxxiv. 358.

McCoig, Malcolm (d. 1789): d. Edinburgh, 25 Feb. 1789. Principal gardener R. Bot. Gard. Edinburgh, 1782–89. Wrote 'Flora Edinburgensis' (unpublished). Notes R. Bot. Gard. Edinb. iii., 20, corrections, 5.

Mackay, John (1772–1802): b. Kirkcaldy, Fife, 25 Dec. 1772; d. Edinburgh, 14 April, 1802. Nurseryman superintendent Edinburgh Bot. Garden, 1800. A.L.S. 1796. Friend of George Don, with whom he collected in Scotland. Contributed largely to Eng. Bot. (311, 1123, &c.). Notes Edinb. Bot. Gard. iii. 21 (letters and lists of Scottish plants), 95.

Mahon, John (1870–1906): b. Dublin, 12 May, 1870; d. Royal Hospital, Richmond, Surrey, 6 April, 1906; bur. Richmond. Kew gardener, 1891–7; to Zomba as forester, 1897–9. Curator Bot. Gard. Uganda until 1893. Sent living and dried plants to Kew. Papers in Journ. Kew Guild, 1898, 1903. Gard. Chron. 1906, 256 (portr.). Kew Bull. 1906, 394. *Dissotis Mahoni* Hook. f.

Marrat, Frederick Price (1823?–1904): b. Liverpool? 1823? d. Liverpool, 5 Nov. 1904. Conchologist. Curator in Liverpool Free Public Museum. One of founders of Liverpool Nat. Field Club. Mosses, hepatics, and lichens of Liverpool in Proc. Lit. Phil. Soc. Liverpool, 1854–1860. 'Fossil Ferns in Ravenhead Colliery' (with H. Higgins), 1872. Proc. Liverpool Field Club, 1904, 8. R.S.C. iv. 248; viii. 335; x. 726. Jacks. 182, 255. *Bryum Marratii* Hook. & Wils.

Masters, Maxwell Tylden (1833–1907): b. Canterbury, 15 April, 1833; d. Ealing, Middlesex, 30 May, 1907. Son of William Masters (q. v.). M.D. St. Andrews. F.L.S. 1860. F.R.S. 1870. Lect. Bot. St. George's Hospital, 1855–68; Editor Gardeners' Chronicle, 1865, till death. 'Vegetable Teratology,' 1861; 'Botany for Beginners,' 1872; papers on *Passifloraceæ* and *Coniferæ* in Trans. and Journ. Linn. Soc.; papers in Journ. Bot. from 1863. Contrib. monographs to Fl. Trop. Africa and Fl. Brit. India. Herbarium at Kew. British plants at Canterbury. Pritz. 208. Jacks. 579. R.S.C. iv. 280; viii. 382; x. 743.

Journ. Bot. 1907, 257 (portr.). Kew Bull. 1907, 325 (bibliogr.). Gard. Chron. 1907, i. 368 (portr.), 377, 398, 418. Proc. Linn. Soc. 1907–8, 54. *Mastersia* Benth.

Maughan, Edward James (1790–1868): b. Edinburgh, 1790; d. Edinburgh, 1868. Son of Robert Maughan. "A keen botanist." Contrib. localities to various Floras. Notes R. Bot. Gard. Edinb. iii. 292.

Mitten, William (1819–1906): b. Hurstpierpoint, Sussex, 20 July, 1819; d. same place, 30 Nov. 1906. Bryologist. Sussex Mosses in Ann. Mag. N. Hist. 1851. 'Musci Austro-Americani,' 1869. A.L.S. 1847. Pritz. 219. R.S.C. iv. 416; viii. 412; x. 823. Jacks. 581. Journ. Bot. 1906, 329 (portr.). Proc. Linn. Soc. 1906–7, 49 (bibliogr.). Kew Bull. 1906, 283. Gard. Chron. 1907, i. 89. *Mittenia* Gottsche. = *Pallavicinus*. *Mittenia* Lindb. = *Mniopsis*.

Monro, Sir David (1813–77): b. Edinburgh, 1813; d. Newstead, near Nelson, N.Z., 1877. Speaker, 1861–2. Knight. First student of alpine fl. of South Island, N.Z. Sent plants to Kew. Correspondent of W. J. Hooker. 'Geogr. Bot. of Nelson and Marlborough,' Trans. N. Z. Institute, i. (1868). Dict. Nat. Biog. xxxviii. 182. R.S.C. iv. 443. Cheeseman, Manual N. Z. Flora, xxvi. *Senecio Monroi* Hook. f.

Moon, Henry George (1857–1905): b. Westminster, 18 Feb. 1857; d. St. Albans, Herts, 6 Oct. 1905. Artist. Illustrated the 'Garden' fr. 1880, 'Reichenbachia,' 1886–90. Journ. Bot. 1906, 182. Gard. Chron. 1905, ii. 287 (portr.).

Moore, Charles (1820–1905): b. Dundee, 10 May, 1820; d. Sydney, N.S.W., 30 April, 1905. F.L.S. 1863. Younger brother of David Moore. Director of Sydney Bot. Garden, 1848–96. 'Handbook of the Flora of N.S.W.' (with Ernst Betche), 1893. 'Catalogue of N.S.W. Timbers,' 1862. Cyb. Hib. xxx. R.S.C. viii. 430; x. 840. Jacks. 582. Journ. Bot. 1905, 280. Journ. Kew Guild, 1905, p. 264, with portr. Report Sydney Bot. Gard. 1905. Gard. Chron. 1894, ii. 185; 1905, i. 299 (portr.).

Mossman, Samuel (fl. 1850). Collected in Australia and N. Z. in 1850. Mosses described by C. Müller, Bot. Zeit. 1851, 545 *et seq.* Journ. Bot. 1851, 31. *Mnium Mossmanianum* C. Müll.

Nation, William (1826–1907): b. Staplegrove, Somerset, 1826; d. Clapham, Surrey, 18 Oct. 1907; bur. Wandsworth Cemetery. Entered Kew Gardens, 1848. Went to Peru in 1850. Prof. at Guadeloupe College, Lima. Plants at Kew. Journ. Kew Guild, ii. 379. Kew Bulletin, 1908, 46. Gard. Chron. 1907, ii. 330. *Quamoclit Nationis* Hook.

Oliver, Joseph William (1833–1907): b. 1833; d. Harborne, Birmingham, 1 Jan. 1907. Taught botany in Birmingham for thirty years. 'Elementary Botany,' 1890; 'Systematic Botany,' 1894. Gard. Chron. 1907, i. 48.

Orr, David (d. 1892?): b. Belfast?; d. Dublin, 1892?. To Glas-

nevin Garden, 1854, retired 1882. Worked at Mosses and Hepatics and collected in various parts of Ireland; corresponded with W. Wilson and Lindberg. Irish Mosses, Journ. Bot. 1881, 83; specimens in Herb. Mus. Brit. *Fissidens Orrii* Braithw.

Parnell, William (1833–1906): b. Ireland, 1833; d. Glasnevin, Dublin, Dec. 1906. Went to Kew, 1852; employed in Herbarium and in Bentham's Herbarium. To Glasnevin as foreman, 1869. Knew British plants well. Journ. Kew Guild, 1907, 382. Gard. Chron. 1906, ii. 400.

Pattison, Samuel Rowles (1809–1901): b. 1809; d. 27 Nov. 1901. Of Launceston. F.G.S. 1839. 'Chapters on Fossil Botany,' 1849. Quart. Journ. Geol. Soc. 1902, lxii. Jacks. 177 (erroneously "J. R. Pattison").

Percy, Hugh, 1st Duke of Northumberland (1715–86): b. Newby Wiske, 1715; d. Syon House, Isleworth, 6 June, 1786; bur. Westminster Abbey. F.R.S. 1736. "Not only a great encourager of botanical studies, but greatly skilled in the science himself," Miller, Gard. Dict. ed. vi. (1770). Dict. Nat. Biogr. xliv. 418. Portr. by Reynolds; by Hamilton, engr. by Finlayson; by Sharples, engr. by Hodges (1784), &c. *Piercea* Mill. = *Rivina* L.

Phillips, William (1822–1905): b. Presteigne, Radnorshire, 4 May, 1822; d. Shrewsbury, 22 Oct. 1905. F.L.S. 1875. F.S.A. Mycologist. 'Elvellacei Britannici' (specimens), 1874–81; 'Manual of British Discomycetes,' 1887; 'Filices of Shropshire,' 1877. R.S.C. viii. 618; xi. 10. Jacks. 259. Journ. Bot. 1905, 361 (portr.); 1906, 184. Gard. Chron. 1905, ii. 331 (portr.). Proc. Linn. Soc. 1905–6, 44. *Phillipsia* Berkeley.

Pim, Greenwood (1851–1906): b. Monkstown, co. Dublin, 4 May, 1851; d. same place, 14 Nov. 1906. B.A. Trin. Coll. Dubl. 1872. M.A. 1876. F.L.S. 1876. One of founders of Dublin Nat. Field Club (Pres. 1888–9). Mycologist. Papers in Proc. Dublin Soc. Sci., &c. Irish Naturalist, 1907, 169. R.S.C. xi. 23. Gard. Chron. 1906, ii. 364. *Pimina* Grove.

Playfair, David Thomson (1855–1904): b. Mar. 1855; d. Bournemouth, 1 Feb. 1904. M.D. Edinb. F.L.S. 1888. Field botanist; had herbarium. Journ. Bot. 1904, 96.

Powell, James Thomas (1833–1904): b. Daventry, Northamptonshire, 3 April, 1833; d. Parkstone, Dorset, 14 Jan. 1904. Schoolmaster. Treasurer Watson Exchange Club, 1885–1900. Journ. Bot. 1904, 95. *Rubus Powellii* Rogers.

Preston, Rev. Thomas Arthur (1833-1905): b. Westminster, 10 Oct. 1833; d. Thurcaston, Leicestershire, 6 Feb. 1905. B.A. Camb. 1856; M.A. 1859. F.L.S. 1872. Ordained deacon, 1858; priest, 1860. Master at Marlborough College, 1858–85; founder of College Nat. Hist. Soc. Worked at phenology. Rector of Thurcaston, 1885. 'Flora of Marlborough,' 1863; of Wilts, 1888; of Leicestershire, in preparation. Jacks. 594.

Journ. Bot. 1905, 362. Proc. Linn. Soc. 1904–5, 49. R.S.C. viii. 658; xi. 64.

Purchas, Rev. William Henry (1823-1903): b. Ross, Herefordshire, 12 Dec. 1823; d. Alstonfield, Staffs., 16 Dec. 1903. B.A. Durham, 1857. Ordained priest, 1857. Worked at *Rubus*, *Rosa*, *Hieracium*, &c. Papers in Bot. Gazette, 1849–51, Journ. Bot. 1865–95, &c. 'Flora of Herefordshire' (with A. Ley), 1889. Plants in Nat. Herbarium. Journ. Bot. 1904, 80 (portr.). Jacks. 253. R.S.C. v. 43; viii. 673. *Rubus Purchasianus* Rogers.

Reed (or Reid), **James** (fl. 1692). "Plants from Barbados by James Reid the quaker sent thither on King W^ms^ account, 1692." Herb. Sloane lv.: also clxxxiv. and cclxxxiv; Sloane Index 448. Mus. Pet. cent. i. n. 31. Petiveriana i, Comm. iv. nos. 161–269.

Reilly, John (1793?–1876): b. and d. Ireland. Schoolmaster, afterwards coastguardsman. Collected in various parts of Ireland and had a herbarium. Phanerogams purchased by R. M. Barrington. Journ. Bot. 1877, 179.

Riddell, Maria, *née* Woodley (fl. 1772–1802): b. St. Kitts? 1772? Visited Madeira and St. Kitts, 1788; Antigua and Barbuda, 1790. 'Voyages to the Madeira and Leeward Isles,' 1792 [anon.], with list of Antigua plants, first for island. Journ. New York Bot. Gard. vii. 275 (1906). Journ. Bot. 1907, 118. Dict. Nat. Biogr. xlviii. 272.

Rottler, John Peter (1749–1836): b. Strasburg, June, 1749; d. Madras, 27 Jan. 1836. Danish missionary at Madras: orientalist. Collected on Coromandel coast, 1795. Herbarium at Kew. Tablet in church at Vepery, Madras. R.S.C. v. 304. Journ. Bot. 1851, 67; Fl. Ceylon, iv. 64. *Rottlera* Roxb.

Sanders, Gilbert (fl. 1849–65). Algologist. '*Desmarestia*' in Proc. Dublin Nat. Hist. Soc. i. 34 (1849). R.S.C. v. 392; viii. 826. Notes Bot. Sch. Trin. Coll. Dubl. Jan. 1901, 150.

Sanderson, John (1820-1–1881): b. Greenock, 1820–1; d. Durban, March, 1881. Settled in Durban, 1850. Hon. Sec. Horticultural Soc. of Natal. Travelled and collected extensively in South Africa. Sent plants and drawings to Harvey and to Kew. Bot. Mag. t. 4716. Harvey, Fl. Cap. i. 9. R.S.C. v. 392; xi. 277. *Sandersonia* Hook.

Sanderson, Sir John Scott Burdon (1828–1905): b. Jesmond, Northumberland, 21 Dec. 1828; d. Oxford, 24 Nov. 1905. M.D. Edinb. 1851. D.C.L. Durham. LL.D. Edinb. Prof. Physiology, University Coll., London, 1874–82; Oxford, 1883–95. Regius Prof. Medicine, Oxford, 1895-1904. Baronet, 1899. Pupil of J. H. Balfour. 'Vegetable Embryology' in Todd's Cyclopædia. F.R.S. R.S.C. v. 392; viii. 827; xi. 277; xii. 648. Notes Edinb. Bot. Gard. ii. 272. Encycl. Brit. ed. x. vol. 26, 464. Portr. by Rudolf Lehmann, 1893; John Collier, engr. Art. Journ. 1894, 68.

Schomburgk, Sir Richard (d. 1891): d. Adelaide, S. Australia, 1891. Ph.D. Knight of the Crown. Accompanied his brother Sir Robert to Guiana in 1840. 'Reisen,' 1848. Director of the Adelaide Bot. Gard., 1870. 'Bot. Reminiscences in Brit. Guiana,' 1876. 'Fl. S. Australia,' 1875. Pritz. 286. Jacks. 604. R.S.C. v. 520; viii. 879.

Schomburgk, Sir Robert Hermann (1804–65): b. Freiburg an der Unstrut, 5 June, 1804; d. Schöneberg, Berlin, 11 March, 1865. Knighted, 1844. Ph.D. In W. Indies, 1830. 'Remarks on Anegada,' Journ. R. Geogr. Soc. ii. (1832), 150. In Brit. Guiana, 1835–9 and 1840–4. Discovered *Victoria regia*. Consul, St. Domingo, 1848–57; Bangkok, 1857–64. 'British Guiana,' 1840. 'History of Barbadoes,' 1847. Drawings of Guiana plants in Bot. Dept., Mus. Brit. Plants in Herb. Mus. Brit. and at Kew, described by Bentham in Journ. Bot. 1840–1. Autobiog., Leopoldina, i. (1859), 34. Pritz. 286. Jacks. 369. R.S.C. v. 520; viii. 879. Lasègue, 216. Symbol. Antill. i. 152; iii. 121. Harshberger, Botanists of Philadelphia, 190. *Schomburgkia* Lindl.

[**Sinclair, Archibald** (1731?–95): b. 1731?; d. 7 Oct. 1795; bur. Penarth churchyard, Glamorgan, where his epitaph describes him as harbinger of George III. and "a justly celebrated and scientific botanist." Journ. Bot. 1907, 381.]

Slack, Henry (d. before 1845). Of London and Epsom. "A botanist of great promise who was unfortunately cut off from life at an early age." Griffith, Palms of India, 161. Received Medal Soc. Arts for dissecting microscope, 1831. 'Elementary Tissue of Plants,' Trans. Soc. Arts xlix. 127 (1833), 'Motion of Fluids in Plants,' *op. cit.* l. 177. R.S.C. v. 713. *Slackia* Griff. = *Iguanura*.

Somerville, Alexander (1842–1907): b. Glasgow, 1842; d. Hillhead, Glasgow, 5 June, 1907. Educated at Glasgow. To Calcutta for fifteen years. B.Sc. Glasgow. F.L.S. 1881. Papers in Trans. Glasgow Nat. Hist. Soc. and Bot. Soc. Edinb. R.S.C. v. 747. Journ. Bot. 1907, 288. Ann. Scot. Nat. Hist. 1907, 193 (portr.). Proc. Linn. Soc. 1907–8, 61.

Spencer, Herbert (1820–1903): b. Derby, 27 April, 1820; d. Brighton, Sussex, 8 Dec. 1903. 'Principles of Biology,' 1864–7. R.S.C. v. 770; viii. 988; xi. 460. Encycl. Brit. ed. 10 xxxii. 785 (portr.). Numerous portrs.: *see* A.L.A. Portrait Index. Engr. by G. E. Perine, 1872. Bust by E. Onslow Ford.

Stevenson, Rev. John (1836–1903): b. Coupar Angus, Perthsh., 1836; d. Glamis, Forfar, 27 Nov. 1903. D.D. St. Andrews, 1888. Minister of Established Church of Scotland. Mycologist. One of founders of Scottish Cryptogamic Soc. 'Mycologia Scotica,' 1879. 'British Fungi (Hymenomycetes),' 1886. Journ. Bot. 1904, 64. Ann. Scott. Nat. Hist. 1904, 1. Jacks. 246. R.S.C. xi. 495.

Stewart, Rev. James (1831–1905): b. Edinburgh, 14 Feb. 1831; eaten by cannibals in Nigeria, April 1905. Presbyterian missionary in Central Africa from 1862. Collected in Zambesia,

1862–73. Pl. in Nat. Herbarium and at Kew. Journ. Bot. 1906, 144. *Crotalaria Stewartii* Baker.

Thompson, Rachel Ford (1856–1906) : b. York, 31 Aug. 1856 ; d. Southport, Lanc., 9 Dec. 1906 ; bur. Southport Cemetery. Daughter of Silvanus Thompson ; grand-daughter of John Tatham. Botanical secretary to F. J. Hanbury. Knew *Hieracia* and drew up account of them for Babington's Manual, ed. 9. Studied Settle flora, 1882–93. Journ. Bot. 1907, 78. 'Wings,' xxv. (1907), 17, with portr.

Thompson, Robert (1798–1869): b. Echt, Aberdeensh, Sept. 1798; d. Chiswick 7 Sept. 1869. In Chiswick garden 1824–69. 'Cat. of Fruits.' Collaborated with Loudon. Contributed to Treasury of Bot. Gard. Chron. 1869, 963, 989.

Thompson, William (1823–1903) : b. 1823 ; d. Ipswich, 3 July, 1903. V.M.H. Introduced *Aquilegia chrysantha*, &c. 'English Flower Garden,' 1851–2. Contributed to Treasury of Bot. Jacks. 408. Gard. Chron. 1903, ii. 30, 44.

Townsend, Frederick (1822–1905): b. Rawmarsh, Yorksh. 5 Dec. 1822; d. Cimiez, Alpes Maritimes, 16 Dec. 1905. B.A. Camb. 1850; M.A. 1855. F.L.S. 1878. F. Bot. Soc. Ed. 1846. M.P. 1886–92. Friend of Babington and Newbould, from 1847. 'Flora of Hampshire,' 1883; ed. 2, 1904. Hampshire Bot. in Victoria County History, 1900. Jacks. 253. R.S.C. vi. 17; viii. 1105; xi. 630. Journ. Bot. 1906, 113, with photogravure portr. Proc. Linn. Soc. 1905–6, 47, with bibliogr. *Spartina Townsendi* Groves.

Travers, William Thomas Locke (1819–1903) ; b. near Newcastle, co. Limerick, 9 Jan. 1819 ; d. Wellington, New Zealand, 26 April, 1903. F.L.S. 1863. In New Zealand fr. 1849. Studied alpine pl. of South Island. Ornithologist. Contrib. Trans. N.Z. Institute. Pl. at Kew (1860–80). R.S.C. viii. 1110; xi. 635. Cheeseman, Manual N.Z. Flora xxvi.–xxvii. Proc. Linn. Soc. 1907–8, 64. *Traversia* Hook. f. = *Senecio*. *Veronica Traversii* Hook. f.

Tristram, Rev. Henry Baker (1822–1906): b. Eglingham, Northumberland, 11 May, 1822; d. Durham, 8 March, 1906. B.A. Oxon, 1844. D.D. Durham 1882, LL.D. Edinb. 1868. Canon of Durham, 1870. F.L.S. 1857–69. F.R.S. 'Cyperus Papyrus,' Journ. Linn. Soc. ix. 329 (1866). 'Fauna and Flora of Palestine,' 1884. R.S.C. vi. 44; viii. 12; xi. 647. Journ. Bot. 1906, 144. Jacks. 614. Portr. in Men of Mark, 1883.

Tucker, Robert (1832–1905): b. Walworth, Surrey, 26 April, 1832; d. Worthing, 29 Jan. 1905. M.A. Camb. Mathematician. Contrib. to Fl. Middlesex and Fl. Hampshire. I. Wight plants, in J. Bot. 1870–74. R.S.C. viii. 1126. Journ. Bot. 1905, 168. University Coll. School Mag. 1899, 243.

Veitch, James Herbert (1868–1907) : b. Chelsea, 1868 ; d. Chelsea, 13 Nov. 1907 ; bur. Exeter. F.L.S. 1889. Travelled in India, Japan, Australia, &c. 'A Traveller's Notes,' 1896. 'Hortus Veitchii,' 1906. Proc. Linn. Soc. 1907–8, 65.

Vickers, Anna (d. 1907): d. Paris, 1907. Algologist. Travelled in Canaries 1895–6 and in Antilles 1898–9 and 1902–8. 'Phycologia Barbadensis,' 1908 (posthumous, w. biogr.). 'Liste des Algues de la Barbade,' Ann. des Sci. Nat. 1905, 45. 'Contribution à la fl. algol. des Canaries,' *ibid.* 1906, 293. *Vickersia* Karsakoff.

Wakefield, Thomas (1836–1901): b. Derby, 23 June, 1836; d. Southport, Lancs. 15 Dec. 1901; bur. North Meols. Missionary in E. Africa, 1862–1901. Sent plants to Kew 1880, 1884. 'Life' published by R.T.S., 1904 (portr.). *Turræa Wakefieldii* Oliv.

Walker, Rev. Francis Augustus (1841–1905): b. Southgate, Middlesex, 1841; d. Cricklewood, Middlesex, 31 Jan. 1905. B.A. Oxon, 1864; D.D. 1883. F.L.S. 1871. Microscopist. Collected in Iceland, 1889; see Journ. Bot. 1890, 79. Had a herbarium. Proc. Linn. Soc. 1904–5, 55.

Ward, Harry Marshall (1854–1906): b. Hereford, 1854; d. Torquay, 26 Aug. 1906; bur. Huntingdon Road Cemetery, Cambridge. F.L.S. 1886. F.R.S. 1888. B.A. Camb. 1880, M.A. 1883. Sc.D. Cambridge. D.Sc. Victoria, 1902. Cryptogamist, Ceylon, 1880–85. Prof. Bot. R.I.E. Coll. 1885–95. Prof. Bot. Cambridge, 1895. 'Trees,' 1904–5. Annals of Bot. xxi. p. ix. with bibliog. and portr. R.S.C. 747. Jacks. 170. Journ. Bot. 1906, 422. Gard. Chron. 1906, ii. 164. Kew Bull. 1906, 281. Proc. Linn. Soc. 1906–7, 54. New Phytol. vi. i. (1907).

Wilford, Charles (d. 1893): d. Wimbledon, Surrey, 1893. Assistant in Kew Herb. 1854–57. Collector in Hongkong 1857–8, Formosa 1858, Corea and Japan 1859. Pl. at Kew. Bretschneider 400, 539. Journ. Kew Guild 1901, 38. *Tripterygium Wilfordii* Hook. fil.

Williamson, John (d. 1780): d. Edinburgh, Sept. 1780. Principal Gardener Edinb. Bot. Gard. 1756 ?–1780. MS. 'Narrative of Experiments on Trees,' 1769, in Garden Library. Notes Edinb. Bot. Gard. iii. 18.

Winter, John Newnham (1831?–1907): b. 1831?; d. Kew, 18 Jan. 1907; bur. Brighton. M.R.C.S. Pteridologist. Pupil of Lindley. Kew Bull. 1907, 68. Gard. Chron. 1907, i. 64.

Wood, Emily Margaret (1865–1907): b. Calcutta, 23 Aug. 1865; d. Higher Tranmere, Birkenhead, 28 Oct. 1907; bur. Wallasey Cemetery. Hon. Sec. Liverpool Nat. Field Club. Illustrated Green's 'Flora of Liverpool.' Journ. Bot. 1907, 454; Proc. Liverpool Nat. Field Club, 1907, ii. (portr.).

Wright, Charles Augustus (1834–1907): b. London, 1834; d. Kew, 13 July, 1907. Ornithologist. F.L.S. 1878. Had herbarium of Maltese and British plants. Proc. Linn. Soc. 1907–8, 66.

THE SUBSECTION EU-CANINÆ

OF THE

GENUS ROSA

BY

MAJOR A. H. WOLLEY-DOD

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INTRODUCTORY.

THE remarks in the following notes refer almost exclusively to the species and varieties of the subsection *Eu-caninæ*, one of six into which Crépin divided the section *Caninæ*, the other five being *Villosæ*, *Tomentosæ*, *Rubrifoliæ*, *Jundzilliæ*, and *Rubiginosæ*. The first two subsections were dealt with by the Rev. A. Ley in this Journal for 1907, p. 200. Of the third and fourth subsections, no representatives have been identified as British, and the fifth I have not yet studied. I have not followed Crépin in his subdivision into species, because although there is a great deal to be said in favour of his retention of a large aggregate species in *R. canina*, with its eight or more groups of unnameable varieties, his general treatment of the whole subsection does not accord with that by other continental authors.

In writing the list for the tenth edition of the *London Catalogue* I have made five species out of the three in the ninth edition, retaining as varieties the subordinate species, almost all of which have been given full specific rank by their authors. It will, I hope, be seen that my intention is neither destructive nor constructive. All I have done is to follow continental authors in separating the hairy-leaved varieties of *R. canina* and *R. glauca*, grouping them under *R. dumetorum* and *R. coriifolia* respectively. I have also taken *R. Borreri* Woods as a type species instead of *R. obtusifolia*, and have introduced into the list as varieties such subordinate species as have been identified as British by competent authorities.

Since Mr. Baker's "Monograph of British Roses" appeared in 1869 (Journ. Linn. Soc. xi. 197–243), little has been written on the subject by British botanists. The appearance of that work stimulated the collection and distribution of Roses through the Exchange Club, but this temporary energy died out, and the genus, so far as our islands are concerned, has since been com-

paratively neglected. Meantime, continental botanists have not been idle, and the number of recognized species has vastly increased, as is evidenced by the works of Déséglise, Crépin, Keller, Rouy & Foucaud, &c.; and during the past two or three years I have been endeavouring, by means of books and herbaria, to pick up the threads of their labours.

In studying the subsection *Eu-caninæ* I have had the immense advantage of being able to consult Déséglise's large collection, which was acquired for the National Herbarium in 1884. I have also examined Smith's & Woods' herbaria at the Linnean Society, the British collection of the National Herbarium, and the general collection at Kew, as well as the writings of the authors above quoted and of others. I must, however, confess at once, owing probably to the fact that the subsection has been considerably oversplit, that although I find it easy in many cases to deny that a specimen should bear the name it does, I feel very little more confidence in my ability to give it its correct name than before, and in many cases I am unable to distinguish between specimens of different species named by their own authors. In going through Déséglise's herbarium, some of the covers in which contain twenty or thirty or occasionally more specimens of one species, no one can fail to be struck with the great dissimilarity of the individual specimens under one name; in fact it would be no great exaggeration to say that no two quite agree, and that if one were to work through one species, being guided by descriptions alone, there would be no difficulty in assigning the individuals to half a dozen different species. In support of this opinion is the disconcerting fact that quite frequently one finds a given specimen bearing three or four names given to it by as many competent critics, even though such names may belong to species widely separated. It also happens in many cases that Déséglise's British examples differ more widely from the average of the continental specimens and from their descriptions than do any other individuals in the covers. Finally, there is the impossibility of obtaining types of almost any of the species; few continental authors seem to have troubled to quote types, and when they do it is frequently obvious that the species have been founded on single specimens.

Before proceeding to give in detail descriptions and notes on the species and varieties which have been identified as British, I will call attention to the principal characteristics which have been relied upon for their differentiation.

The *habit* is generally mentioned in descriptions, but in Britain, where so many of our Roses grow in hedges, the habit is so often obscured by clipping, or by the influence of the surrounding growth, as to be of little value. Moreover, in dried specimens the habit is lost, at least as regards height and direction of stem, even if much importance should be placed on these points. The closeness or laxness of the setting of the leaves and prickles may present more obvious characters, and are often mentioned by foreign botanists, but I have found them of little specific value.

Colour of stem, leaves, stipules, and bracts may offer valuable evidence, as it undoubtedly does in *Rubus*. Thus, for example, in some varieties the stipules and bracts, and often the leaflets, have a strong tendency to redden, or, as is frequently the case, to be red when young, and to turn green when mature. The leaves may be dull, shining, or glaucous, dark or pale, besides presenting various shades of green, which, though they may defy description, may offer valuable points to a careful observer in the field. Still, as in *Rubus*, although one may acquire by experience a knowledge of the distinctive coloration of the various organs, it is not easy to convey these impressions to others by means of written descriptions; moreover, much of the colour is lost or altered by drying.

The *prickles* of course vary greatly in size, shape, and distribution, and would appear to afford one of the best characteristics. Thus they may be hooked or straight, stout or slender, conical or subulate. They are rarely, in the subsection under consideration, other than uniform except in *R. latebrosa* Déségl. among our British varieties, and the presence of acicles on the stems of some of the continental varieties usually indicate hybridity with members of the *gallica* section. Unfortunately, a study of specimens shows that much latitude is permissible. A species which is described as having hooked prickles may have them straight, or one which should have them numerous shows only a few. Descriptions frequently state that the flowering-branches or petioles are unarmed, yet it is just as common to find prickles where they are stated not to exist as it is to notice their absence when the description does not exclude them. Again, many species have their prickles in pairs at the insertion of the petioles, yet this fact is mentioned as peculiar only to a few species, and therefore seems to be of little real importance. Incidentally I may mention that I have found the supposed prickle characters of *R. tomentella*, at least in many cases, to be of little value in separating it from varieties of *R. dumetorum*. The importance of securing good specimens to represent the prickles must not be lost sight of. Very strong shoots of the year, and flowering-shoots, should not be relied upon for prickle characters. They are best shown by a piece of the old stem from which the flowering-branches spring, though of course if such stem be a very strong one, the same objections apply to it as to the strong shoots of the year. These stems produce abnormally stout prickles, and frequently, in their lower part, abnormally numerous and irregular ones, while those of the flowering-shoots are, as a rule, abnormally small and weak.

Stipules and *auricles* are almost always described in detail, but some authors of repute, Crépin among others, belittle their importance, and to judge from specimens, the characteristics they afford, in some varieties at least, are misleading and inconstant. The form of the stipules, the glandular development on their edges, and the direction of the auricles are subject to great variation among the individual examples of a species. On the other hand,

their hairiness and the glandular development on their backs is less variable, and usually affords assistance in the determination of the species. *R. glauca* and most of its varieties may usually be recognized by the broadness of their stipules and their spatulate auricles.

The *petioles* may be glabrous or hairy, glandular or not, prickly or unarmed, but these characters must not be relied upon alone to give critical help. For example, one of the characteristics which has been relied upon to distinguish the species of the *R. canina* group from those of *R. dumetorum* is their glabrous petioles, those of *R. dumetorum* being pubescent. But some of the varieties of *R. canina* are expressly described as having hairy petioles, and a little hair is observable in many, so that in this respect the species overlap. Again, the presence or absence of glands would appear from the descriptions to be a suitable auxiliary means of separating species of the *R. dumalis* group from those of *R. lutetiana*, yet many of the latter group have petioles quite as glandular as many of those associated with *R. dumalis*.

The *leaflets* are, of course, of the highest importance, their serration, clothing, shape, size, and colour offering valuable characters by which the species and varieties may be distinguished. Even here, again, the characters are not absolute, the whole of the species passing into one another by insensible gradations. Thus, as regards dentition, we may begin at one end of the scale with *R. lutetiana*, with leaflets whose teeth are quite simple and uniform, passing into some of its allied species with teeth, though simple, varying in size. The next step brings us to species which may belong either to the *R. lutetiana* or to the *R. dumalis* groups, namely those with a single small intermediate tooth between some or all of the main teeth, and other species of similarly doubtful position, where the secondary teeth appear on the back of the primary ones, and may be more than one in number, till finally we come to the strongly biserrate varieties of *R. dumalis*, the best developed of which have two or three denticles on each side of the primary teeth.

Again, though all the species allied to *R. canina* are said to have glabrous leaflets, rarely a slightly hairy midrib is found, while several of those under *R. dumetorum* have the hairs on the under surface of the leaflets reduced to a few on the midrib, and very rarely even these are quite absent. The glands on the under surface seem to be related to those on the tips of the teeth and on the petiole, and though more prevalent in some varieties than others, those that exist on the midribs only are not of much consequence; but glands on the secondary nerves, *i. e.* the primary branches from the midrib, are of very great importance, and serve to separate almost all the species of the *R. Borreri* group from those of *R. canina*, except those of the subgroup *Scabratæ*. Ordinarily no glands are found on the under surface of the leaflets (*i. e.* other than on the midrib and secondary nerves) in any of the species of the subsection *Eu-caninæ*, but they may certainly be

seen in occasional examples of the more glandular species, which examples should perhaps have been referred to the subsection *Rubiginosæ*. I would also call attention to the existence in many species of undoubted *Eu-caninæ*, and in occasional specimens throughout the whole subsection, of minute gland-like organs more or less densely scattered all over the under surface, which would probably escape attention unless the leaflets are examined through a lens under oblique light. Some botanists, to whom I have referred examples showing these organs, say candidly that they cannot see them. Others see them, but say they are not glands or, if glands, are too small to be of consequence. The question at once arises, At what size do they begin to be of importance? a question to which I myself cannot supply an answer. I can only say that they appear most commonly in those species which show a tendency to glandular development in other parts, and though very rarely seen in the varieties of *R. lutetiana*, are by no means necessarily confined to those with glandular midribs or secondary veins. Moreover, I find many examples in Déséglise's herbarium both among the species allied to *R. tomentella* and the more glandular ones of *R. canina* which only show these micro-glands (a name suggested by Mr. Marshall), without the more conspicuous stalked glands on the midribs, &c., such as should be found in these varieties. However, so far as I know, no author mentions the existence of micro-glands, so beyond calling attention to their existence I make no further comment.

The *size* and *shape* of the leaflets vary very greatly, and some authors have attempted to group the species by means of the size of the leaflets, but such an arrangement breaks down. It is sufficient to note that some species show a tendency to produce large and others small leaflets, but so much depends upon soil and environment that much reliance must not be placed upon this. The shape, by analogy with other genera, might be supposed to be of great importance; but, as with the size, it can only be stated generally. Some species have a tendency to produce elliptical, others suborbicular, leaflets; the bases in one may be rounded, in another cuneate; the apices may be acuminate or subobtuse, but I have not found such characteristics to be of more than secondary help, and one must expect considerable variation up to rather wide limits, which even descriptions often admit. There is, moreover, the difficulty that various authors use the adjectives descriptive of shape in such very different senses that a description alone may convey a totally incorrect idea of the real shape it is intended to convey. Except where otherwise specifically stated, shape and size refer to the terminal leaflets of the well-developed leaves about the middle of the flowering-shoots or on ordinary barren shoots, but abnormal barren shoots are more apt to produce abnormal size and shape of leaflets than they do prickles, to which I have already called attention. The older British authors, down to and including Mr. Baker, have usually distinguished between flat and keeled leaflets. Foreign authors rarely mention this point, which may, however, have its impor-

tance, but it must be noted in the living plant. Similarly the rugosity or reticulation of the veining, the surface, whether dull, glaucous, or shining, and the colour, whether light or dark, as well as the shade of green, are all characters which probably have their importance, but which are for the most part lost in the dried plant.

The *number* of leaflets does not vary much. In the vast majority of the subsection under review the leaflets are seven in number, but they will be found to vary from five to nine. When nine predominates, hybridization with *R. pimpinellifolia* may be suspected, in which case the prickles will almost always afford strong evidence; and the prevalence of five leaflets may show an alliance with *R. collina*, a species which is perhaps not a native of Britain, though it and its hybrids appear frequent on the Continent. Here, again, a tendency for some of the prickles to degenerate into acicles will also be seen. The leaflets of the *Eu-caninæ* are usually very shortly petioluled; in fact, there is only one species in which they are stated to be subsessile, namely *R. rubescens* Rip., a variety of *R. dumalis* which has not been identified as British. *R. coriifolia* and *R. glauca* with their allied species are said by some authors to be characterized by the leaflets being so crowded that they overlap at the edges, while those allied to *R. canina* usually have them more widely spaced, but this rule, like most others, is subject to considerable variations.

The *peduncles* may be shorter or longer than their bracts. They are in most species described as being overtopped by the bracts, but their length in specimens does not always tally with that in the description. Generally speaking, the species grouped under *R. glauca* and *R. coriifolia* have shorter peduncles than those of *R. canina* and *R. dumetorum*, but there are notable exceptions on both sides. The number of peduncles in a cluster varies greatly, and seldom affords characters of importance, though some species are distinguished on paper by their peduncles being in clusters of four or five or more, up to twenty or thirty. The number appears to be chiefly due to development. One part of a bush may have the peduncles mostly solitary, while the other may have them mostly in large clusters. They may be glabrous, glandular, or hairy in every degree, except that the hairiness seems never to be more than scanty, and these characters afford very valuable evidence of the group to which a species belongs. Examples are not rare of individuals of a species which should have glandular peduncles having them smooth or almost so, but the converse is much rarer, even one or two glands or some of the peduncles showing almost certainly an alliance with *R. andegavensis*, *R. verticillacantha*, *R. Deseglisei*, or other glandular species.

Next to the leaflets, the *sepals* are the most variable organs with which we have to deal. Descriptions give with considerable minuteness their degree of pinnation, the shape of the pinnæ and of the terminal appendage, also their hairiness or glandulosity, but a study of many hundreds of specimens in Déséglise's herbarium

convinces me of the unreliability of all these characters. Even their direction after the fall of the petals is by no means so constant as has been supposed. Study in the field shows me that, in Cheshire and Surrey at least, strongly reflexed sepals—*i.e.* those whose backs touch or almost touch the fruit—are quite infrequent. The most usual direction for the bulk of the species grouped under *R. canina* and *R. dumetorum* is loosely reflexed or spreading horizontally, and it is not unusual to find them more or less erect. M. Crépin used to write on such specimens, "Sépales redressés accidentellement." Erect sepals are characteristic of *R. glauca* and *R. coriifolia*, but here again one frequently meets these quite as much reflexed as in average examples of *R. canina*.

The colour of the *petals* is always very carefully noted, and authors often mention a slight difference in their shade as one of the characteristics by which two closely allied species may be discriminated, while in others greater latitude is allowed. The value of this character is greatly discounted by the difficulty an author has in conveying in words his impression of a colour, and it is always lost, or at least changed, in drying. As in the case of the leaves, &c., doubtless the colour of the petals has its importance, and the collector should at least note whether they are pale or bright rose, or white. Their size and shape also often form a guide to the diagnosis of a species.

The *styles* are of great importance in the identification of the species, but even here an examination of authentic specimens shows that much latitude is allowed. The whole section *Caninæ* is distinguished from the *Synstylæ* (*R. systyla* and *R. arvensis*) by their styles being free; that is, not agglutinated into a column, even though they may be considerably protruded from the disc. I must confess that I have not mastered this technicality. I find it very frequently the case that an obvious member of the *Caninæ* has its style cohering, so that they can with difficulty be separated. The cohesion is perhaps not so complete as in the *Synstylæ* when they have almost to be torn apart, but at any rate when dried it is common to find the styles of the *Caninæ* cohering in a solid column. As a rule, however, a flower or fruit or two can be found on any bush in which the styles are more or less free. The styles may also be glabrous or hairy to a variable degree. Even when the styles are glabrous, a minute papillosity may often be observed on the stigmas, but this has a very different appearance to the long loose hair of the styles. Foreign botanists describe the hairiness of the styles as "velus" or "hérissés," or "wollig" or "behaart." The difference seems to me to be entirely one of degree, not of kind, but in order to keep as closely as possible to the original descriptions, I have used the word "woolly" or "villous" for "velus" and "wollig," and "hispid" for "hérissés" or "behaart," the latter adjective being applied to the less densely hairy styles.

The arrangement of the *stigmas* is of sectional and specific rather than varietal importance. Thus the whole section *Caninæ* is distinguished from the *Synstylæ* by the stigmas being in a more or less flat or somewhat rounded head, those of the *Synstylæ*

being arranged in an elongated cone. Again, *R. coriifolia* and *R. glauca* may be distinguished from *R. canina* and *R. dumetorum* by the head of stigmas being broad and hemispherical, as well as by the styles being woolly, the stigmatic head of *R. canina* and *R. dumetorum* being narrower and flatter, and the styles usually only hispid or glabrous. Woolly styles not infrequently occur in some of the individuals grouped under the two last-mentioned species, but not in conjunction with a broad head of stigmas.

The *fruit*, though considered of great importance, is as variable in size and shape as most of the other organs. Specimens with perfectly globose fruit are constantly to be met in the same cover as those which have them ovoid or even oblong. Moreover, those species which normally have hispid fruit may have it hispid all over or at the base only, description to the contrary notwithstanding. Foreign authors seldom mention urceolate fruit, though quite a frequent form, as described by Baker in many of the species in his "Review of British Roses." The form of the calyx tube is always described independently of that of the fruit, but it is not stated at what age the calyx tube is considered. It may be supposed that it is before the petals fall, because after that the form of the fruit changes but little, while before the fall of the petals the form is undeveloped and so frequently merges insensibly into the peduncles and sepals as to be difficult to define, but this usually gives it a more elongate form than it ultimately assumes. Specimens should, if possible, be gathered just as the fruit turns colour.

It may be inferred from the above remarks that I have no great faith in the possibility of distinguishing the great majority of the species of the subsection *Eu-caninæ*, and this inference is a correct one, though it must not be interpreted into meaning that I wish to demolish all the work that has been done hitherto and merely to retain a few species as varieties or forms. I have endeavoured to point out the difficulties the genus presents. Quite recently l'Abbé Coste, to whom I had sent all my Roses of the *lutetiana* group, wrote to me: "These are all unimportant varieties of the common *R. canina*, to which it would be giving too much honour to adorn them with specific names. These varieties, which I have studied for twenty years, are innumerable, and there are almost as many as there are bushes." But Roses are so divergent in technical characters and in appearance that it is difficult to believe that they lend themselves to no system of classification. May it not be that our want of perspicacity is at fault? Seeing that order has been evolved out of a chaotic beginning of such genera as *Rubus* and *Hieracia*, I do not despair of someone in the future profiting a little by this paper in bringing our Rose list into line with those on the Continent.

Of all the authors I have consulted, the two whose writings throw the best light upon British Roses are Crépin and Déséglise, but the works of Rouy and of Keller are also of great interest as representing the most modern views, and may prove of assistance in the arrangement of the species, if not in the determination of the varieties. I have also made use of Ripart's classification, which

is on very original lines and was published by Crépin in vol. xxix. of the "*Bulletin de la Société Royale de Botanique de Belgique*" (1890), and of Dumortier's key to the Roses of Belgium, published in 1867 in the same work; also of Christ's *Rosen der Schweiz* (1873) and several other works for their authors' descriptions of species.

Classification.

It may be as well to give the classifications of the genus by the four first-mentioned authors, to show how their sections *Caninæ* (or *Eu-caninæ*) are related to the rest. I give them in tabular form which is, I think, the clearest way of setting them out. Though I fear the classifications will not be clear without it, it would occupy too much space to detail the characteristics of the sections, but I give later on the leading features of the aggregate species which I have adopted and the means by which they can be distinguished from the British species of other sections. The subjoined tables only give the aggregate species corresponding to those in the tenth edition of the *London Catalogue*. I have not given the minor species because no two authors classify them quite alike—in fact, most of them retain the plants we have been accustomed to look upon as varieties as species of equal rank; while others, notably Keller, grade them into subspecies, varieties, and subvarieties. Most, however, keep up many more species than we do in Britain.

Crépin in "Primitiæ Monographiæ Rosarum" (*Bull. Soc. Roy. Bot. Belg.* viii. 1869).

Section.	Subsection.	Species.
I. *Synstylæ*	i. *Arvenses*	*R. arvensis* Huds.
II. *Stylosæ*		*R. stylosa* Desv.
III. *Pimpinellifoliæ*		*R. pimpinellifolia* Linn.
IV. *Sabiniæ*		*R. involuta* Sm.
V. *Montanæ*		*R. glauca* Vill.
VI. *Caninæ*	i. *Lutetianæ*	*R. canina* Linn.
	ii. *Biserratæ*	
	iii. *Hispidæ*	
	iv. *Scabratæ*	
	v. *Pubescentes*	*R. dumetorum* Thuill., *R. coriifolia* Fr.
	vi. *Collinæ*	Varieties of *R. dumetorum* Thuill.
	vii. *Tomentellæ*	*R. tomentella* Lém.
VII. *Rubiginosæ*	i. *Sepiaceæ*	*R. sepium* Thuill.
	ii. *Micranthæ*	*R. micrantha* Sm.
	iii. *Suavifoliæ*	Varieties of *R. rubiginosa* Linn.
VIII. *Tomentosæ*		*R. tomentosa* Sm.
IX. *Villosæ*		*R. mollis* Sm.

CRÉPIN IN "TABLEAU ANALYTIQUE DES ROSES EUROPÉENNES" (*op. cit.* XXVI. 1892).

SECTION.	SUBSECTION.	SPECIES.
I. *Synstylæ*		*R. arvensis* Huds.
II. *Stylosæ*		*R. stylosa* Desv.
III. *Pimpinellifoliæ*		*R. pimpinellifolia* Linn. (also *R. involuta* Sm. and *R. hibernica* Sm. as hybrids).
IV. *Caninæ*	i. *Villosæ*,	*R. mollis* Sm.
	ii. *Tomentosæ*	*R. tomentosa* Sm.
	iii. *Eu-caninæ*	*R. tomentella* Lém., *R. canina* Linn., *R. dumetorum* Thuill. (as a var. of *R. canina*), *R. glauca* Vill., *R. coriifolia* Thuill.
	iv. *Rubiginosæ*	Varieties of *R. rubiginosa* Linn., *R. micrantha* Sm., *R. sepium* Thuill.

DÉSÉGLISE IN *Catalogue Raisonné des Espèces du Genre Rosier* (1877).

SECTION.	SUBSECTION.	SPECIES.
I. *Synstylæ*	i. *Arvenses*	*R. arvensis* Huds.
	ii. *Stylosæ*	*R. stylosa* Desv.
II. *Pimpinellifoliæ*		*R. pimpinellifolia* Linn.
III. *Sabiniæ*		*R. involuta* Sm.
IV. *Montanæ*		*R. glauca* Vill., *R. hibernica* Sm.
V. *Caninæ*	i. *Nudæ*	*R. canina* Linn.
	ii. *Biserratæ*	
	iii. *Hispidæ*	
	iv. *Pubescentes*	*R. dumetorum* Thuill., *R. coriifolia* Fr.
	v. *Collinæ*	Varieties of *R. dumetorum* Thuill.
VI. *Rubiginosæ*	i. *Tomentellæ*	*R. tomentella* Lém., and varieties of *R. coriifolia* Fr.
	ii. *Pseudo-rubiginosæ*	*R. sepium* Thuill.
	iii. *Veræ-rubiginosæ*	*R. rubiginosa* Linn., *R. micrantha* Sm.
VII. *Tomentosæ*	i. *Veræ-tomentosæ*	*R. tomentosa* Sm.
	ii. *Pomiferæ*.	*R. mollis* Sm.

ROUY IN ROUY AND FOUCAUD, *Flore de la France*, vi. (1900).

SECTION.	SUBSECTION.	SPECIES.
I. *Synstylæ*		*R. arvensis* Huds.
II. *Caninæ*	i. *Eu-caninæ*	*R. stylosa* Desv., *R. tomentella* Lém., *R. canina* Linn., *R. dumetorum* Thuill., *R. glauca* Vill., *R. coriifolia* Fr.
	ii. *Rubiginosæ*	*R. rubiginosa* Linn., *R. micrantha* Sm., *R. sepium* Thuill.
	iii. *Tomentosæ*	*R. tomentosa* Sm., *R. omissa* Déségl.
	iv. *Villosæ*	*R. mollis* Sm.
III. *Pimpinellifoliæ*		*R. pimpinellifolia* Linn.

KELLER IN *Synopsis der Mitteleuropaischen Flora* VON ASCHERSON & GRAEBNER, vi. 1 (1900–1902).

SECTION.	SUBSECTION.	SPECIES.
I. *Synstylæ*		*R. arvensis* Huds.
II. *Caninæ*	i. *Vestitæ*	*R. mollis* Sm., *R. tomentosa* Sm., *R. omissa* Déségl.
	ii. *Rubiginosæ*	*R. rubiginosa* Linn., *R. micrantha* Sm., *R. sepium* Thuill.
	iii. *Eu-caninæ*	*R. tomentella* Lem., *R. canina* Linn., *R. dumetorum* Thuill., *R. glauca* Vill., *R. coriifolia* Fr., *R. stylosa* Desv.
III. *Pimpinellifoliæ*		*R. pimpinellifolia* Linn. (also *R. involuta* Sm. and *R. hibernica* Sm. as hybrids).

The subsection with which I am concerned is the *Eu-caninæ* of Crépin's Primit. Monog., which almost corresponds with the same subsection of Rouy, and that of Keller, except that those two authors include *R. stylosa* Desv. Déséglise's section *Caninæ* excludes the subsection *Tomentellæ*, which he places under his section *Rubiginosæ*.

Notwithstanding that the plants I have studied are exactly covered by Crépin's *Eu-caninæ*, I have not adopted his arrangement of it, although it may doubtless commend itself to many, because he makes no attempt to define the species or varieties he includes under his aggregate *R. canina*, but merely gives the

characteristics of the groups into which he divides them, each group being represented by a subspecies of *R. canina*. Excluding non-British species, Crépin's key is as follows :—

1 { Sepals erect after flowering and crowning fruit when ripe. Styles very strongly hispid or tomentose 2
Sepals reflexed after flowering, or spreading, not erect, deciduous before fruit ripens. Styles moderately hispid to glabrous 3

2 { Leaflets pubescent at least on midrib ..... *R. coriifolia* Fr.
Leaflets altogether glabrous, usually glaucous ..... *R. glauca* Vill.

3 { Leaflets more or less pubescent, rather frequently with the secondary nerves glandular, with compound glandular teeth. Outer sepals with numerous lateral appendages, the lower more or less foliaceous and deeply incised 4
Not combining the above characteristics..... 5

4 { [Styles rather strongly hispid. Sepals rising a little after flowering, spreading during the ripening of the fruit. Peduncles and receptacles hispid-glandular ..... *R. abietina* Gren.]
Styles usually little hispid, sometimes glabrescent or glabrous. Sepals reflexed after flowering. Peduncles and receptacles usually smooth, rarely hispid-glandular. Leaflets usually small, roundish oval, shortly attenuate-acute at apex, the secondary nerves usually very salient. Stem-prickles short, hooked, strongly thickened at base ..... *R. tomentella* Lém.

5 { Leaflets pubescent, usually rather small, roundish oval, shortly attenuate-acute at apex, simply toothed, the secondary nerves very salient. Stem-prickles short, hooked, strongly thickened at base ..... *R. obtusifolia* Desv.
Not combining the above characteristics..... *R. canina* Linn.

Varieties of *R. canina*.

Leaflets glabrous :—
  Teeth of leaflets simple :—
    Peduncles smooth ... Vars. of the group *R. lutetiana* Lém.
    Peduncles more or less hispid-glandular
      Vars. of the group *R. andegavensis* Bast.
  Teeth of leaflets double or glandular-compound :—
    Secondary nerves not glandular :—
      Peduncles smooth ... Vars. of the group *R. dumalis* Bechst.
      Peduncles more or less hispid-glandular
        Vars. of the group *R. verticillacantha* Mér.
    Secondary nerves more or less glandular :—
      Peduncles smooth ... Vars. of the group *R. scabrata* Crép.
      Peduncles more or less hispid-glandular
        Vars. of the group *R. Blondæana* Rip.

Leaflets pubescent, at least on midrib :—
  Teeth of leaflets simple :—
    Peduncles smooth Vars. of the group *R. dumetorum* Thuill.
    Peduncles more or less hispid-glandular
      Vars. of the group *R. Deseglisii* Bor.
  Teeth of leaflets double or glandular-compound :—
      Varieties near the two preceding groups or those tending towards *R. tomentella* Lém.

The species I have adopted are very nearly those of Keller, viz. *R. Borreri* Woods, *R. canina* Linn., *R. dumetorum* Thuill., *R. glauca* Vill., and *R. coriifolia* Fr. Keller gives very long and detailed descriptions of these species as understood by him, but I have not transcribed them—first, because they are not authors' descriptions (which I give in their proper sequence); secondly, because my arrangement of the subordinate species does not wholly agree with that of Keller's subspecies, &c.; and thirdly, because his descriptions are those of the type of each group instead of being of the aggregate species so as to exclude the varieties of other groups.

My views of the aggregate species under which I group the British varieties are as follows. Though I do not regard their subordinate species, nor their varieties, as being respectively of equal rank, I have not attempted any division into subspecies, subvarieties, and forms, any arrangement of such being quite arbitrary. One author, for example, might divide the varieties of any one of the species into those with globose and those with oblong fruit; another might take large and small leaflets, or straight and hooked prickles, and so forth. It is simpler, at least when one has only a few varieties, to treat them as of equal rank. I should not, however, quarrel with anyone who regarded *R. dumetorum* as simply covering a group of hairy-leaved varieties of *R. canina*, or took the same view of *R. coriifolia* with respect to *R. glauca*, and of course no matter what the principle of grouping, there must always be a large number of individuals the position of which is uncertain.

1. *R. Borreri* sp. agg. I regard as including all plants with more or less strongly biserrate leaflets, almost always rather or quite densely hairy beneath, and usually glandular on the secondary nerves. The prickles are, as a rule, stout and hooked, but not always large. Even if rather slender they are always much hooked. Exceptional forms are: *R. tomentella* var. *Nicholsoni* Christ, the leaflets of which are almost simply serrate and very slightly hairy on nerves only, also glandular only on the midrib; and *R. arvatica* Baker, which is very thinly hairy on midrib, and almost eglandular beneath. These two might equally well be classed under *R. dumetorum*.

2. *R. canina* sp. agg. This includes all species with leaves quite glabrous on both sides, though they may be glandular on the secondary nerves, as in *R. scabrata* Crép. The leaflets may be uniserrate or glandular-compound serrate. The peduncles may be smooth or glandular, the sepals rarely rising above the disc, or, if they do, they are deciduous before the fruit turns colour. The styles are usually hispid or glabrous, rarely woolly, and are arranged in a subcylindrical column, rarely projecting much, and usually not at all, from the disc. Individuals with subcolumnar styles may approach *R. stylosa* Desv., or those with woolly styles, *R. glauca* Vill. The first-named species has its styles always glabrous and quite combined into a solid column, the stigmas also being in a somewhat elongated conical head; while in *R. canina*

the styles, though they may be slightly combined, can be fairly easily separated, at any rate in the living plant. From the minor species of *R. glauca* those of *R. canina* can always be separated by the absence of a broad hemispherical woolly head of stigmas, and usually by the sepals and narrower stipules.

3. *R. dumetorum* sp. agg. is the counterpart of *R. canina*, but with the leaflets hairy, even if slightly so on the midrib only. Rarely some varieties are slightly glandular on the secondary nerves; these form the passage to *R. Borreri*.

4. *R. glauca* sp. agg. has leaflets of medium or large size, never so small as in some of the varieties of *R. canina*. They are always glabrous, and rarely glandular on secondary nerves, and may be simply or compoundly serrate. The stipules are broad and dilated upwards into large auricles. The peduncles are usually short, and may be glandular or not. The sepals almost always rise above the disc, and, even if only spreading, are much more persistent than in *R. canina*. The styles are very woolly, and the stigmas form a broad hemispherical mass, often almost as broad as the disc.

5. *R. coriifolia* sp. agg. runs almost on parallel lines to *R. glauca*, but its varieties are often smaller and more compact. The essential difference is that the leaflets are hairy beneath, at least on the midrib. The stipules are usually less broad than in *R. glauca*, and the sepals more often reflexed. Some of the species are more or less glandular on the secondary nerves, such as *R. Bakeri*, or at least on the midrib, as in *R. Watsoni* and var. *Lintoni*; but the general habit, rising sepals, and dense woolly head of styles seem to place them in this group rather than in *R. Borreri*.

My plan for dealing with the species and varieties in the British list is to quote first the author's description, supplemented where meagre by that of Déséglise. It must, however, be borne in mind that Déséglise had not, so far as I know, seen types of many of the plants he described; also that it is often the case that various authors differ, sometimes in very essential points, in their descriptions of the same species. I have selected Déséglise because his descriptions are fuller than those of most authors, and almost all are available, besides the advantage of confining one's attention as much as possible to the descriptive language of one person. I have added the description from Mr. Baker's Review in all cases where he published one. These descriptions I have supplemented by notes taken from specimens, confining myself where possible to those named by their authors, also to such British specimens as appear well authenticated. I find, however, such very great variations in the specimens of many of the varieties in a single cover in the British collection, that to publish notes thereon would occupy a volume, so I have almost confined my notes to the specimens named by or accepted by Déséglise as correctly named.

GROUP OF ROSA BORRERI.

Key to British Species and Varieties.*

1 { Peduncles glaudular or at least hairy ..... *R. Borreri* Woods.
  { Peduncles glabrous and eglandular 2

2 { Leaflets hairy above at least when young, more or less densely hairy beneath. Stipules hairy ..... *R. tomentella* Lém.
  { Leaflets usually glabrous above, hairy only on veins beneath. Stipules glabrous 3

3 { Leaflets broadly oval, acute 4
  { Leaflets elliptical, or narrowly oval, acuminate 5

4 { Leaflets rather small, fully biserrate, decidedly hairy on veins *R. Carionii* Déségl. & Gil.
  { Leaflets large, subsimply serrate, thinly hairy midrib only or subglabrous ..... Var. *Nicholsoni* Christ.

5 { Leaflets hairy on side nerves. Fruit subglobose. Styles thinly hairy ..... *R. sclerophylla* Scheutz.
  { Leaflets thinly hairy on midrib only. Fruit ovoid ellipsoid. Styles subglabrous ..... *R. arvatica* Baker.

Rosa Borreri.

Woods in Trans. Linn. Soc. xii. p. 210 (1817).

"Height 6–10 ft. Branches diffuse, olive, prickly. Prickles uncinate, subequal, mostly stipular, binate or solitary. Petioles tomentose and glandular with strong uncinate prickles. Stipules linear, glandular-serrate, hardly glandular beneath, the upper broader, eventually running into ovate lanceolate bracts. Leaflets 7, dark green, shining, ovate elliptical or rhomboidal elliptical, flat, biserrate, glandular-toothed, mostly hirsute both sides, but especially beneath. Peduncles 1–16, with weak setæ or white hairs or even dense pubescence, shorter than bracts. Receptacle ellipsoid, fuscous, glabrous. Sepals triangular elliptic, compound, pinnæ close lanceolate or ovate lanceolate, incised and glandular-serrate. Flowers flesh or reddish. Styles included. Stigmas flattish. Fruit ellipsoid rarely subglobose, deep red.—Leaves usually very dark, always very flat. Differs from *R. collina* mainly in its biserrate, broader and flatter leaves, and calyx much more divided."

Mr. Baker (Review, p. 20) keeps this as a species, distinct from the *canina* group, in which he includes *R. tomentella*. He says:—"6–8 ft., arched, with ascending flexuose branches. Prickles uniform, the base $\frac{3}{8}$–$\frac{1}{2}$ inch deep, the body about $\frac{3}{8}$ inch long, strongly hooked and the lower part robust. Leaves 3–4 inches, the terminal elliptical to broadly ovate cordate, $1\frac{1}{4}$–$1\frac{1}{2}$ inch by $\frac{1}{2}$ inch, full and deep green above, and thinly hairy when young but glabrous when old, pale beneath, hairy chiefly on veins and

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* It must be borne in mind that this and other similar keys to the groups are not drawn up to include foreign species, as that would make them too complicated. Neither must it be supposed that the species can be identified by the keys alone, without the aid of full descriptions.

thinly sprinkled all over with small green viscid glands, occasionally only on midrib and nerves. Teeth moderately open with 2–3 glandular denticles. Petioles pubescent and abundantly setose with 3–4 falcate aciculi. Stipules with lanceolate erect patent auricles, the lower usually pubescent and setose on the back, the upper and the lanceolate acuminate bract usually glabrous but glandular ciliate. Peduncles hispid but much less densely so than in *micrantha*, and especially the aciculi are weaker, often none. Calyx-tube gracefully ovate or elliptical-urceolate, naked or casually a little aciculate. Sepals ¾ inch, ovate lanceolate, rather leaf-pointed, but not so much so as in *micrantha*, the more luxuriant ones with 2–3 large toothed erect-patent pinnæ each side, setoso-ciliate, and almost naked but a good deal glandular on the back. Petals pink, ¾–⅜ inch broad and deep, open flowers about 1½ inch. Styles hairy. Fruit ovate urceolate, deep scarlet, ripe in September, by which time most or all of the sepals have fallen."

Mr. Baker evidently had a too glandular plant in his mind when he wrote the above, and in his Monograph (p. 237) he reduces *R. Borreri* to a variety of *R. canina*, modifying the description in his Review so as to make the leaflets "never more than faintly and sometimes very inconspicuously glandular on the main veins and petiole. Flowers often numerous in a cluster. . . . Styles thinly hairy." He adds that it is nearer to *R. tomentella* than to any other variety.

Déséglise includes this species in his Catalogue, but does not describe it. He places it near *R. tomentella* Lém. in his key, distinguishing it by its glabrous styles. This is incorrect; the styles of *R. Borreri* are quite as hairy as those of *R. tomentella*, even in specimens in Déséglise's own herbarium. Crépin, in Journ. Bot. 1896, p. 232, expresses surprise that neither Woods, Smith, nor Borrer should have described so comparatively common a species as *R. tomentella* Lém., and thinks that *R. Borreri* Woods must refer to it, pointing out that Woods's description fits *R. tomentella* well, and this opinion he says is confirmed by authentic specimens in Babington's herbarium. He adds that *R. inodora* Borr. (non Fr.) is the same. If glandular peduncles were permissible in *R. tomentella* Lém., as some authors allow, I should absolutely agree with Crépin, but I am not satisfied that Léman intended to admit them, his key expressly stating that his *tomentella*, and three other species, have "peduncles glabrous or naked," instead of "peduncles hispid," which appear therefore to be expressly excluded. On the other hand, Woods described *R. Borreri* as having setose or hairy peduncles, and though he has specimens in his herbarium with those parts glabrous, it seems to me best to make *R. Borreri* Woods the type of this group, it being an older name than *R. tomentella* Lém.; moreover, I do not think it correct to regard the two as synonymous, but to place plants with glandular or hairy peduncles to the former, making Dumortier's var. *decipiens* a synonym thereof, while plants with eglandular peduncles must go to *R. tomentella* Lém.

The specimens in Woods's herbarium are numbered 71 to 76. They are not, as a rule, very good ones to describe from, and I can only give the following notes :—

No. 71, from Potter's Bar, is the end of a flowering-branch in a very young state. It is quite unarmed, excepting some small hooked pricklets on the petioles, which are densely pubescent and slightly glandular. Leaflets of medium size, oval, subobtuse or acute, not acuminate, fully glandular-biserrate, subglabrous above, hairy beneath, very finely glandular on midribs and secondary nerves. Peduncles smooth and glabrous. Sepals with broad incised segments, somewhat gland-ciliate, glabrous or nearly so on the back. The styles cannot be seen. From its smooth peduncles I should label this *R. tomentella* Lém.

No. 72, from Stoke Newington, is a rather larger and more advanced flowering-shoot, with hooked but not stout prickles. Leaflets rather small, broadly oval, acute or subobtuse, not acuminate, somewhat hairy above, more densely so beneath, very finely glandular on midrib, scarcely so on secondary nerves. Petioles densely pubescent, somewhat glandular. Peduncles quite hispid-glandular, not hairy. Sepal pinnæ moderately broad, hardly gland-ciliate. Styles cannot be seen. This specimen has a stronger "*tomentella*" look than No. 71, but its glandular peduncles refer it to *R. Borreri*.

No. 73, from Godstone. A weak piece of stem with four or five short flowering-branches. Prickles curved or hooked, some rather stout, others slender and subulate. Petioles and leaflets as before, but very slightly glandular beneath. Sepal pinnæ numerous, somewhat gland-ciliate. Peduncles smooth and glabrous. Styles short, somewhat hispid. This belongs to *R. tomentella* Lém.

No. 74, from Southgate, is the best specimen, but the least characteristic. The prickles are small or rather small, and straightish or hooked, few on flowering-branches. Petioles less hairy and more glandular than in last three. Leaflets large, oval or broadly so, acute, fully biserrate, thinly hairy above, more densely so beneath, with fine scattered glands on secondary nerves. Sepal pinnæ well developed, gland-ciliate. Peduncles somewhat hairy, not glandular. Styles hispid. This is *R. Borreri*.

Nos. 75 and 76 are said to have been gathered from the same bush as No. 74 in another year. I am afraid I cannot be persuaded to believe this. They do not even look as if they came from the same bush as one another, the leaflets being quite different in shape; but when I say they are quite uniserrate, I do not think further comment is necessary.

A specimen collected by Woods in Herb. Brit. Mus. has prickles small but hooked; leaflets rather small, roundish, obtuse, glandular-biserrate, thinly hairy above, shaggy beneath, and with scattered glands; small flowers in a cluster, peduncles quite hispid-glandular, but not hairy, and small globose calyx-tube. The fruit is not formed; styles thinly hispid.

Specimens named by other collectors vary so much that it is

impossible to generalize from them, and it is evident that the species has been much misunderstood. There are specimens in herb. Déséglise from Hayes and Chelsfield, West Kent, collected by Messrs. Groves, and labelled by them *R. micrantha*. Their prickles are large and hooked. Leaflets small, much more conspicuously glandular beneath than in any named *R. Borreri* by Baker, but the dentition is not very glandular, nor are the petioles, though downy pubescent. The peduncles are hispid, in clusters of five or six. I think Déséglise is right in referring this to *R. Borreri* rather than to *R. micrantha*, though the exceptionally glandular leaflets take it towards the latter species. In most specimens the glands, though more numerous than in *R. tomentella*, are equally inconspicuous.

I append the description of *R. tomentella* var. *decipiens* Dum. given by its author in *Bulletin de la Soc. Roy. de Bot. de Belgique*, p. 57 (1867), and a few notes thereon, but, as already stated, I regard it as synonymous with *R. Borreri* :—

"Leaves hairy on nerves beneath, the secondary eglandular. Peduncles aciculate glandular."

Mr. Baker, in his *Monograph of British Roses*, p. 233, places var. *decipiens* on an equal footing with var. *tomentella*, but in a different group. He says: "Like *tomentella*, but the peduncles densely aciculate; the midrib beneath more glandular; the petiole both pubescent and glanduloso-setose, with several unequal aciculi; the sepals not fully reflexed and densely glandulous on the back." He adds that "plants like ordinary *tomentella*, but with aciculate peduncles, have been gathered in Leicestershire and in Cheshire," thus showing that he separates var. *decipiens* by more than its aciculate peduncles. The only other written characters are the more glandular midribs (Dumortier says "secondary nerves eglandular," but does not mention midribs), and the less reflexed, more glandular, sepals, which do not seem of much account. Déséglise and Rouy both admit slightly glandular peduncles with their interpretation of typical *R. tomentella* Lém., so that the only important character left by which var. *decipiens* may be distinguished is its more hispid-glandular peduncles.

There is no material of this variety in Déséglise's herbarium, and the British plants so named at South Kensington and Kew are too variable to draw any satisfactory notes from.

Rosa tomentella Léman.

At the expense of space I give *verbatim* the key published by Léman in the *Bulletin de Science par la Société Philomatique de Paris*, p. 95 (1818). It is of interest, as it is, so far as I know, the only description ever published by Léman of his species, seven in number, four of which stand in their author's names in our British list. No doubt much might be learnt from his herbarium, but I have had no opportunity of seeing it. With such meagre descriptions and without type specimens, one is completely at the

mercy of later writers, and can only accept at second-hand what Léman meant by *R. tomentella* ; in fact, I have no evidence that any of the authors I have studied have ever seen a type of Léman's. These remarks apply to a greater or less degree to most of the species of the older foreign authors throughout this paper.

I. Leaves simply dentate :—
  A. Styles coalesced... ... ... *R. arvensis* Linn.
  B. Styles free :—
    a. Peduncles glabrous or naked :—
      * Leaves glabrous :—
        i. Fruit subglobose ... ... *R. pimpinellifolia* Linn.
        ii. Fruit ovate-oblong ... ... *R. lutetiana* Lem.
      ** Leaves villous ... ... *R. dumetorum* Thuill.
      *** Petioles villous ... ... *R. urbica* Lém.
    b. Peduncles hispid :—
      * Leaves villous ... ... *R. rustica* Lém.
      ** Leaves glabrous :—
        i. Fruit ovate-oblong ... ... *R. andegavensis* Bast.
        ii. Fruit globose ... ... *R. spinosissima* Linn.

II. Teeth of leaves serrate on the lower side :—
    a. Peduncles hispid :—
      * Leaves glabrous on edges ... *R. verticillacantha* Mér.
      ** Leaves glandular on edges ... *R. pumila* Jacq.
    b. Peduncles glabrous or naked :—
      * Leaves glandular on edges ... *R. biserrata* Mér.
      ** Leaves glabrous :—
        i. Fruit globose ... ... *R. eglanteria* Linn.
        ii. Fruit ovate-oblong ... ... *R. canina* Linn.
      *** Leaves pubescent ... ... *R. tomentella* Lém.

III. Leaves with teeth serrate and glandular on both sides :—
  a. Peduncles hispid :—
    * Leaves eglandular, villous beneath... *R. pubescens* Lém.
    ** Leaves eglandular, pubescent both sides ... ... *R. villosa* Linn.
    *** Leaves glandular :—
      i. Fruit globose ... ... *R. tenuiglandulosa* Mér.
      ii. Fruit elliptic ... ... *R. rubiginosa* Linn.
      iii. Fruit elongate ... ... *R. histrix* Lém.
    **** Leaves glabrous ... ... *R. nemoralis* Lém.
  b. Peduncles glabrous or naked :—
    * Leaves glandular ... ... *R. sepium* Thuill.

Déséglise ("Essai Monographique," in Mém. Soc. Acad. de Maine-et-Loire, x. p. 132 (1861)). "Branching, rather tufted, of low stature. Branches lax, greyish-green. Prickles on old wood strong, very dilated at base, inclined at tip, those of the branches smaller and falcate. Leaflets 5–7, *oval-rounded*, pointed, lightly villous above, *pubescent beneath with numerous glands on nerves*, doubly glandular-serrate, all petioluled, the terminal rounded at the base, pointed at apex. Petioles *villous*, *glandular*, channeled, prickly. Stipules rather broad, glabrous above, pubescent below. Auricles short, diverging, glandular-ciliate. Peduncles short, *glabrous or*

glandular, solitary or in a corymb, usually hidden by broad bracts which are oval-acuminate, more or less villous below, glandular-ciliate, equal to or longer than the peduncles. Calyx-tube *ovoid* or *roundish*, *glabrous*. Sepals pinnatifid, the inner a little tomentose at edges, the other glabrous, glandular-ciliate, reflexed, deciduous. Styles hispid, a little *in a column*. Disc a little salient. Flowers medium, pale rose. Fruit roundish, orange-red.—Like *R. obtusifolia* Desv., but petioles villous and glandular; leaflets glandular-biserrate, glandular on nerves; styles in a column at base. Flowers pale rose. Fruit roundish, orange-red."

Baker (Review, p. 102 (1864)). "Branches usually lithe and flexuose, prickles strongly hooked. Leaflets flat, firm, thinly hairy all over above when young, thinly hairy all over beneath, but only very slightly glandular. Teeth open spreading, triangular cuspidate, as broad as deep, each with 3–4 gland-tipped denticles. Terminal broadly ovate, much rounded at base, and sometimes almost as broad as long. Petioles hairy and setose, and furnished with 3–4 much hooked aciculi. Stipules and bracts hairy on back, copiously setoso-ciliate. Peduncles quite naked. Calyx-tube naked, subglobose. Petals pale. Sepals leaf-pointed and fully pinnate, slightly hairy but not at all glandular on the back, copiously setoso-ciliate, reflexed after petals fall. Fruit subglobose, not turning scarlet till October, by which time the sepals have fallen. Styles hairy, somewhat protruded."

Mr. Baker's description agreed very closely with my notion of *R. tomentella*, but I think the leaflets are more hairy, and very often more glandular on the nerves beneath than in his description. I think the small broad often obtuse or only cuspidate hairy leaflets, with broad very glandular compound teeth, and almost always some inconspicuous glands on the secondary nerves are the most striking features of this plant. The prickles are not so good a guide, and in very many examples could hardly be distinguished from those of *R. canina*. Rather small flowers, short peduncles, strongly pinnate much glandular-ciliate sepals, rather small but broadly ovoid fruit and often slightly projecting moderately hairy styles, combined with the above-mentioned characteristics, make this species in its typical form one which is fairly easily recognizable.

There are a large number of specimens in Déséglise's herbarium. The prickles are by no means always strong and hooked; very often they are straightish, but conical, not subulate as in most straight-prickled species, and if slender, as they often are, they are much hooked. The leaflets are almost always short, broad, and close set on the petiole. The glands on the midrib and secondary nerves are often quite inconspicuous and difficult to see, except with a lens and in oblique sunlight, but some can be found in most specimens. The nerves are often salient, as Crépin says, and the midrib is often whitish or yellowish, but these are not conspicuous features nor by any means confined to this species. Both Rouy and Déséglise admit plants with slightly glandular peduncles, the former author crediting var. *decipiens* Dum. with

"very hispid peduncles," while Déséglise does not mention the variety at all. I do not think glandular peduncles are generally accepted for typical *R. tomentella* Lém., and Léman's key expressly excludes them (see remarks under *R. Borreri* Woods). The fruit in most of Déséglise's specimens is ovoid or globose-ovoid.

There are nine British examples in herb. Déséglise. One collected by Briggs at Plympton St. Mary, and labelled by him "*R. micrantha* with naked peduncles, ? *R. tomentella*," has larger leaflets than usual, and more conspicuously glandular all over the lower surface, but less so than in *R. micrantha*. Another from Pennycross, similarly labelled, has equally glandular leaflets but of smaller size. His Bickleigh specimen is similar, but has slender hooked prickles. Other specimens have slender hooked prickles, but the leaves are almost always more typical. In addition to the fine glands on the nerves, microglands (see p. 5) can very often be found on the lower surface. The styles are often prominent.

Rosa Carionii

Déséglise & Billot in Bull. Soc. Roy. Bot. Belg. xix. p. 34 (1880).

"Tall. Branches elongate, green or vinous. Prickles robust, reddish or whitish, dilated at base, straight or falcate. Prickles of main stem numerous, strong, dilated at base, curved or inclined, those of branches smaller, opposite or geminate, *sometimes some branches unarmed*. Young shoots often vinous. Petioles villous, *with some small glands, unarmed or prickly*. Leaflets 5–7, green, *glabrous or with few scattered hairs* above, pale and *pubescent on nerves beneath*, eglandular; terminal long-petioluled, oval acute or subacute, rounded at base, lateral petioluled, *oval, oval-elliptical or obtuse*, some short-pointed, others obtuse or rounded, glandular-biserrate, primary teeth mucronate, open. Stipules more or less elongate, narrow, *glabrous* both sides, glandular-ciliate. Auricles short diverging. Peduncles *short, glabrous*, 1–5, usually hidden by rather large bracts, which are often denticulate, oval-acuminate, glabrous, glandular-ciliate. Calyx-tube *ovoid, a little contracted at top*, glabrous, greenish or vinous. Sepals glabrous with broad appendages, two entire with tomentose edges, three pinnatifid, the pinnæ with some glands, reflexed, deciduous, salient in bud, shorter than corolla. Style hispid. Disc nearly flat. Corolla *very pale, almost white*. Fruit *roundish*. Like *R. tomentella* Lém., but leaves eglandular. Very near *R. canescens* Baker."

There are eight sheets in herb. Déséglise, none being of the author's collecting. Both leaves and prickles show a considerable resemblance to those of *R. tomentella*; in fact, there are usually some evident though fine glands on the under surface of the leaflets, so that I think this is better placed in this group than in the *Pubescentes* as Déséglise placed it; it seems to differ only in having its leaflets less hairy and less glandular. Its flowers are 1–5 in a cluster, fruit rather small, ovoid-globose, styles thinly hispid or subglabrous.

I have introduced it into our list on the strength of a speci-

men collected by Briggs near Plymouth, and labelled by him "*R. tomentella*?" Déséglise places it to the present species. It has the small broad leaflets of *R. tomentella*, but they are less strongly biserrate. The prickles are rather slender and small-based; petioles with numerous small prickles; fruit ovoid and styles thinly hispid.

Rosa sclerophylla

Scheutz in Botaniska Notiser, p. 82 (1872).

"Stem with hooked prickles. Leaves with 2–3 pairs of lanceolate acute doubly toothed leaflets, which are thinly glandular and hairy on the chief nerves. Flowers usually solitary on erect, always smooth or glandular peduncles. Fruit always smooth, roundish oval, hard till ripe. Sepals pinnate, reflexed and (probably) deciduous. Leaves quite inodorous. Between *R. inodora* and *R. canina*."

I have seen a specimen at Kew named by Scheutz from Carlsbrona. It appears to differ from *R. tomentella* mainly in its narrow leaflets, which are quite elliptical, not short and broadly oval, as in that species. They are equally fully biserrate but less hairy, only decidedly so on nerves beneath, which are also glandular. The prickles are much hooked but slender; auricles long acute; sepals glandular on back; fruit medium or rather large, globose; peduncles smooth; styles thinly hairy.

Déséglise has only a single specimen collected by Gabrielson in Kallaberg. It has rather large but very long leaflets, very coarsely serrate, the teeth again serrate. The prickles are hooked, not very large but with very long bases. Petioles finely pubescent, shortly but fairly densely glandular; midribs very thinly hairy, almost glabrous, with very few glands and none on secondary nerves. Only one fruit, which is quite small and ovoid; style thinly hairy; sepals strongly glandular-ciliate, but bracts cannot be seen. The long leaflets, subglabrous beneath, take this species a long way towards *R. scabrata* Crép.

This apparently rare species is introduced into the British list on the strength of a specimen collected by Mr. Baker at Boltby (Yorks) and labelled by him "*R. subcristata*, small montana form." This was identified by Christ with *R. sclerophylla* Scheutz (Journ. Bot. 1875, 102), from which I abridge the following notes: It differs from *R. tomentella* in its smaller leaflets, not oval-orbicular but oval-lanceolate, cuneate at the base, rather firm, light not dark green, smooth above, rather shining, the nerves with adpressed hairs beneath mixed with rather frequent glands, which do not extend to the parenchyma. Toothing very strong, acute and compound. Petioles villous and glandular. Peduncles shorter than in *R. tomentella*, scarcely as long as the fruit. Sepals falling late. Prickles less large and less hooked, though very dilated and triangular as in *R. tomentella*. A very tufted bush, towards *R. sepium*. Christ thinks that a plant from Mr. Baker named *R. arvatica* belongs here.

I have not seen Mr. Baker's Boltby plant, nor do I know which

of those labelled *R. arvatica* Christ refers to. His notes tally fairly well with Scheutz's description and specimen, but the only two examples I have seen have large as well as long leaflets, not small as Christ says, nor are the peduncles conspicuously short. His description of the prickles suit Gabrielson's Kallaberg plant, but not Scheutz's, though no doubt these organs vary.

I have seen a plant at Kew, collected by Scheutz, labelled "*R. sclerophylla* Christ non Scheutz," which is quite different to Scheutz's plant, and bears no resemblance to *R. tomentella*. It belongs, I think, to *R. coriifolia*. I cannot therefore understand the synonymy in E. B. ed. 3 Supp. p. 146, wherein he quotes *R. sclerophylla* Christ non Scheutz as a synonym of *R. tomentella* Lém.

Rosa tomentella Lém. var. Nicholsoni

Christ in Botanical Exchange Club Report, 1880, p. 16.

"Differs from *tomentella* in slender prickles, teeth deeper, almost simple. Plant more glabrous. Sepals hispid on back. Fruit globose or ovoid."

The above meagre description was based upon a plant gathered at Sharon-on-the-Ure, near Ripon, Yorkshire, by Mr. Nicholson, a specimen of which is preserved in the Kew Herbarium. It has straightish, moderately stout prickles, hardly slender, as Christ says. The leaflets are large, ovate, and broadly rounded below; almost simply serrate, only here and there irregular, glabrous above and almost so beneath, being only inconspicuously hairy on the nerves. The midrib has minute glands, but not the secondary nerves, though the surface is densely microglandular. Petioles finely pubescent, but scarcely glandular. Fruit small, globose, on solitary peduncles, one of which has two setæ, the other none. Styles longish, rather thickly hispid, quite loose. The specimen has no sepals.

This seems to me to be nearer *R. Deseglisei* than *R. tomentella*, but in deference to Dr. Christ's opinion I leave it under the latter.

Rosa arvatica

"Puget" ex Baker in Review, p. 33 (1864).

"Habit, growth and prickles of normal [i.e. *R. canina*]. Leaves firm, hardly flat, glabrous above, paler beneath and hairy on midrib, glandular on midrib and secondary nerves. Serrations moderately sharp and open and numerous, each with 2–3 gland-tipped teeth. Terminal narrowly ovate or elliptical, narrowed at base. Petiole prickly, pubescent and setose. Stipules and bracts hardly hairy on back, but some of the lower ones a little glandular, all closely setoso-ciliate. Peduncles quite naked. Calyx-tube ovate or elliptical. Sepals copiously pinnate and leaf pointed, closely setoso-ciliate, and slightly glandular on the back, spreading but not fully reflexed after the petals fall. Fruit stone-hard when green, broadly ovate or subglobose, not turning scarlet till the beginning of October, by which time the sepals have fallen. Styles glabrous,

or very slightly hairy. Resembles *sepium* in shape of leaves and in styles."

It does not appear that Puget ever published a description of his plant, but specimens named by him show it clearly to have been a variety of *R. sepium* Thuill. Mr. Baker's description does not fit Puget's specimens, though it may have been drawn from an exceptionally thinly glandular form, but I have been unable to find an authentic example of Puget's *arvatica* which is glandular only on the midrib and secondary nerves; they are always more or less glandular on the whole lower surface. Equally, Mr. Baker's description does not fit his own plants. Before he wrote the Monograph Mr. Baker evidently realized that his specimens did not agree with Puget's, as in that work he altered the name to *R. canina* var. *arvatica* Baker, adding the following note, but without saying whether he had intentionally altered his views:— "Bears much the same relation to *urbica* that *dumalis* does to *lutetiana*. Leaflets obovate-oblong, naked above, hairy on the ribs below; the serrations copiously compound; the accessory teeth gland-tipped; the petioles densely pubescent and glanduloso-setose, and the glands often extending to the midrib beneath; the bracts, stipules, and sepals copiously gland-ciliated. Fruit ovate." The inference from his description is that the glands beneath do not extend to the side nerves, and sometimes not even to the midrib.

Specimens which correspond most nearly with Mr. Baker's description, and labelled by him *R. arvatica*, have elliptical (hardly obovate-oblong) leaflets, larger and broader than in Puget's plant, thinly hairy on the midrib, inconspicuously glandular on midrib, and sometimes also on side nerves; fully biserrate, teeth not very glandular. The prickles are few but not large nor strongly hooked. The peduncles are 1–3; fruit small and ovoid; sepals spreading, fully pinnate, glandular-ciliate but not glandular on back. Styles glabrous.

The plant just described I take to be *R. canina* var. *arvatica* Baker of the Monograph, but there is another plant represented by three specimens in herb. Déséglise, two of which were unnamed by Mr. Baker, but the third is his No. 26 quoted in the Monograph as one of the types of his *R. canina* var. *arvatica*. This No. 26 was labelled by him *R. arvatica* var. *nemoralis*. All these three differ from plants labelled *R. arvatica* in their large, broadly oval, obtuse leaflets, quite different to the elliptical leaflets of that species. They are very thinly hairy on the midrib only, and no glands are visible. The toothing is coarse, fully biserrate, and not much glandular. The prickles are small, slender, and straight, but there is no old stem. The styles are in a densely hispid but hardly villous head. Déséglise questioned the correctness of placing these to *R. arvatica* at all, and Crépin, no doubt quite correctly, refers them to some variety of *R. coriifolia*.

We must therefore, I think, take *R. canina* var. *arvatica* Baker as a plant with few moderate curved prickles, large leaflets, well spaced on the petioles, varying from elliptical to oval, but never broadly so; strongly biserrate, usually hairy on the midrib (Baker's

No. 27, which Crépin refers to the *R. Blondæana* group, is quite glabrous, while Briggs's specimens are quite hairy on the side nerves), inconspicuously glandular on the midrib and sometimes also on the secondary nerves. Fruit ovoid-ellipsoid; sepals spreading; styles glabrous, or nearly so.

A plant collected at Puttenham by Groves, and labelled "*R. sepium*," is placed to *R. arvatica* Puget by Déséglise, no doubt correctly, as it clearly belongs to *R. sepium* and not to *R. tomentella*.

Foreign and allied Species.

The only foreign species known to me of the *Tomentella* group which might be found in Britain is *R. similata* Pug. It has the prickles and small broad biserrate leaflets, glandular beneath, of *R. tomentella*, but the peduncles, and often the base of the fruit, are strongly hispid-glandular; the fruit also is ellipsoid, and the styles glabrous.

Of British varieties I do not think any are likely to be mistaken for varieties of *R. tomentella*, except some of those classed under *R. coriifolia* Fr. Of these *R. Watsoni* Baker, *R. Bakeri* Déségl., var. *incana* Woods, and var. *Lintoni* Scheutz have the leaflets more or less glandular beneath, but they may all be recognized as belonging to the *coriifolia* group by their woolly heads of stigmas. Some of them also often have suberect or at least subpersistent sepals.

GROUP OF ROSA CANINA.

The description given by Linnæus of *Rosa canina* in *Species Plantarum* i. p. 491 (1755) is—"Rosa caule aculeato petioli inermibus calycibus semipinnatis." In ed. ii. p. 704 he has—"Rosa germinibus ovatis pedunculisque glabris, caule petiolisque aculeatis." The description in the "Mantissa," p. 391, is a little fuller, *viz.*:—"Caulis lævis, internodiis aculeis 2 alternis. Petioli aculeati. Folia acutiuscula nuda. Pedunculi glabri. Germen glabrum. Petala pallida vel incarnata."

The only other British species described by Linnæus are *R. villosa*, *R. rubiginosa*, *R. arvensis*, *R. pimpinellifolia*, and *R. spinosissima*. The inference is that his *R. canina* includes all plants with glabrous leaflets, whether uniserrate or biserrate, and with glabrous peduncles, pale rose- or flesh-coloured flowers, and ovoid fruit. The older British botanists applied the name "*R. canina* L." to plants with either fully biserrate or uniserrate leaflets.

Déséglise, in the preface to his *Catalogue Raisonné*, pp. 17–21, quotes some notes received by him from Mr. Baker on the Roses of Linnæus's herbarium, who says of No. 25 *R. canina* Linn. herb.: "Exactly *R. lutetiana* Lém. Toothing simple; petioles with 3–4 recurved prickles, but neither villous nor setose; stipules lightly glandular-ciliate; peduncles naked; sepals much pinnatifid and strongly glandular-ciliate throughout their whole length." I have seen this specimen and should describe the sepals as remarkably little glandular-ciliate.

Léman, however, in his key (see p. 19), separates *R. canina* Linn. from his *lutetiana*, crediting the former with leaflets having teeth serrate on the lower side. Most modern authors only use *R. canina* Linn. in an aggregate sense; but Déséglise, acting no doubt on Mr. Baker's note, makes it a segregate, synonymous with *R. lutetiana* Lém. his description of which I will give under the latter species.

Mr. Baker, in "A Monograph of British Roses," in Journ. Linn. Soc. xi. p. 225 (1869), uses *R. canina* Linn. in an aggregate sense, with the following description:—"A tall shrub with elongate arching branches. Prickles scattered, robust, equal, hooked. Leaflets simply or doubly serrate, glabrous and eglandular both sides, or slightly pubescent, chiefly beneath. Flowers one or few, peduncles mostly naked, sepals mostly naked on the back, reflexed and deciduous or sometimes ascending and subpersistent, usually copiously pinnate. Styles more or less hairy. Fruit ovate, urceolate, or round (chiefly late), furnished with a conspicuous disc." He includes in it, however, such glandular-leaved species as *R. Borreri* Woods, *R. Bakeri* Déségl. and *R. marginata* Wallr., as well as some that are certainly more than "slightly pubescent."

I use *R. canina* Linn. in a more restricted sense, excluding all plants with hairy leaflets, even if only on midrib beneath. I also exclude *R. glauca* Vill. and its varieties.

The species I group under *R. canina* may be conveniently divided into four subgroups, thus:—

i. Leaflets simply serrate, eglandular on secondary nerves beneath. Peduncles eglandular.

ii. Leaflets biserrate, eglandular on secondary nerves beneath. Peduncles eglandular.

iii. Leaflets uniserrate or biserrate, eglandular on secondary nerves beneath. Peduncles glandular.

iv. Leaflets biserrate, glandular on midrib *and also* on secondary nerves. Peduncles glandular or eglandular.

Subgroup i. corresponds exactly to Déséglise's *Nudæ* and to Crépin's aggregate *R. lutetiana*. Subgroup ii. corresponds to Déséglise's *Biserratæ* and Crépin's *R. dumalis*. Subgroup iii is the same as Déséglise's *Hispidæ*, but covers both groups *R. andegavensis* and *R. verticillacantha* of Crépin. Subgroup iv. combines Crépin's groups *R. scabrata* and *R. Blondæana*, which are included in part of Déséglise's section *Rubiginosæ*, subsections *Tomentellæ* and *Glandulosæ*.

Subgroup i. Leaflets simply serrate, eglandular on secondary nerves beneath. Peduncles eglandular.

Key to British Species.

1 { Styles hispid 2
  { Styles glabrous 4
  { Styles in a woolly column. Low shrub. Flowers white
  R. syntrichostyla Rip.

2	Tall, with large leaflets. Prickles hooked, stout	3
	Short, with medium or small leaflets, and straightish subulate prickles	*R. senticosa* Ach.
3	Fruit ovoid. Sepals reflexed	*R. lutetiana* Lém.
	Fruit globose. Sepals patent	*R. sphærica* Gren.
4	Leaflets large, spaced. Flowers white, in clusters. Fruit narrow	*R. flexibilis* Déségl.
	Leaflets small, acute each end. Flowers rose. Fruit ovoid	*R. mucronulata* Déségl.

Rosa lutetiana Lém.

The only description published by Léman will be found in his key, which I have reproduced on p. 19.

Déséglise, in "Essai Monographique" in Mém. de la Soc. Acad. de Maine-et-Loire, x. p. 52 (1861), writes under *R. canina* Linn., which he uses in a segregate sense:—"A straight elevated bush, with long branches, glabrous all over. Prickles strong, scattered, compressed and dilated at base, arched at tip. Petioles glabrous, eglandular, but prickly. Leaflets all petiolulate, green, glabrous, firm, oval, uniserrate, the upper teeth connivent. Stipules glabrous with diverging auricles, the upper dilated. Peduncles glabrous, one to several, axillary or terminal, with one oval acuminate glabrous bract. Sepals pinnatifid, glabrous, tomentose on edges, salient in bud, shorter than corolla, reflexed, deciduous. Styles hispid, shorter than stamens. Flowers rose or white. Fruit ovoid oblong, coriaceous, erect." He remarks elsewhere that he regards this as Linnæus's type, and restricts the name to plants with glabrous eglandular petioles, simply dentate glabrous leaflets, glabrous peduncles and calyx-tubes, hispid styles, rose or white flowers and ovoid or obovoid fruit.

Baker, in "Review of British Roses," p. 25 (1864), says:—"Leaflets pale green and somewhat glaucous, not flat, firm, glabrous both sides, the terminal ovate, narrowed or somewhat rounded at base, the serratures numerous, simple, sharp, and connivent. Petioles naked or nearly so, but furnished with 3 or 4 hooked aciculi. Stipules and bracts naked on the back, not at all or only the auricles setoso-ciliate. Peduncles naked. Calyx-tube and fruit varying from ovate-urceolate to subglobose. Sepals leaf-pointed and fully pinnate, naked or slightly hairy on the back towards the edges, hardly setoso-ciliate. Sepals reflexed after the petals fall, ripening in October or late September, before which the sepals have fallen. Styles slightly hairy."

All authors regard this segregate or variety as glabrous all over, only the stipules, bracts, and sepals being somewhat glandular-ciliate, with the inside of the sepals and the edges of the inner ones more or less tomentose. The leaflets are simply serrate, peduncles naked, flowers pale rose or white, sepals reflexed and deciduous, fruit ovoid and styles hispid.

There is a large number of specimens in herb. Déséglise, and quite a considerable number of these differ in some important particular from his description. The prickles are almost always strong and hooked, but a few examples have them straightish

and subulate. The leaflets for the most part are large, elliptic rather than ovate, often longly acuminate, rounded or narrowed at the base. The toothing varies considerably. Some specimens show 2 or 3 denticles to each main tooth, but such specimens are, as a rule, named with doubt. More often a secondary toothlet lies between each primary one, so that the toothing becomes irregular, though all descriptions require them to be regular and uniform. The petioles have quite frequently a few glands upon them, perhaps more often than not, so that they are actually more glandular than many examples of varieties allied to *R. dumalis* Bechst., but they are always quite glabrous. The sepals vary greatly, but are usually strongly reflexed, very rarely rising as high as the disc. The fruit is usually rather large and ellipsoid-oblong, but varies a good deal. The styles are generally moderately hispid, occasionally subglabrous, but very rarely densely hairy. British botanists do not appear to have paid sufficient attention to this point.

I have not made detailed notes of the British examples in herb. Déséglise, as the above remarks cover them.

R. canina Linn. vars. *glaucescens* Desv. and *nitens* Desv. are subvarieties with glaucous and very shining leaflets respectively. The former also has somewhat hairy petioles, and the latter more elongated leaflets, but at best they only present such varieties from the type as may be found in all species. No doubt both occur frequently in Britain, but I have not seen them named on good authority from our islands.

R. fallens Déséglise was described as a species, but has been regarded by most authors as a mere variety of *R. lutetiana* with quite hairy petioles, though even this character is not always obvious. Though apparently as common on the Continent as *lutetiana*, it does not appear to have been identified as British. Specimens look to me very like var. *glaucescens* Desv., but have larger more elliptical not glaucous leaflets, and usually more hairy petioles.

Rosa senticosa

Acharius in Kongliga Vetensk. Acad. Handl. p. 91 (1813).

"2 feet to 2½ feet high. Stem straight, as thick as a large goose-quill or less, ashy, with fuscous striæ or reddish, slightly flexuose above, very prickly. Branches rather short. Lower prickles dense, straightish, conical, elliptical at base, compressed, slightly deflexed at apex, but not hooked. Upper cauline prickles more scattered, slender, subulate, not compressed. Leaves 3 inches long, longer than internodes. Leaflets subsessile, ovate oblong, ½ inch wide, acute, pale both sides, especially beneath, very finely serrate, teeth with a few denticles, callous-glandular. Petioles terete, 2 inches long, naked, smooth or with scattered very slender white hairs and a few straight or slightly curved prickles, occasionally glandular at the top. Stipules linear, auricles lanceolate, glandular. Flowers small, subsolitary. Bracts lanceolate, glabrous, glandular-serrate, occasionally leafy. Peduncles glabrous,

naked, shorter than fruit. Calyx-tube oblong, ventricose, base and neck constricted, glabrous, naked. Sepals ovate lanceolate, subreflexed, deciduous, white-tomentose within and on edges, glabrous on back, pinnæ linear, subglandular, the terminal appendage elongate, quite entire, as long as the petals. Corolla white or very pale rose. Petals obcordate, sub-bilobed or emarginate, apiculate, as long as broad. Styles scarcely exceeding disc. Stigmas in a subglobose head. Fruit ovate-globose, subconical, more ventricose at the base and narrower at the apex, obtuse, as large as an acorn."

Mr. Baker does not mention this in the Review, and only gives it a very short notice in the Monograph, thus:—"Fruit perfectly globular, but much smaller than in last [*R. sphærica* Gren.]; the general habit of the plant very slender and flexuous, the fully-developed leaves not more than an inch long by 6–7 lines broad; the teeth very acute. 'It has the aspect of *R. sepium*, but the petioles and leaflets are glandless,' Déséglise." This last-quoted remark of Déséglise is quite misleading.

From Acharius's description and plate, I understand a dwarf plant, with very short flowering-branches 2–3 inches long; patent subulate or conical prickles, close-set on stem, but scattered on branches; leaflets $\frac{3}{4}$ inch by $\frac{1}{2}$ inch, oval or broadly elliptic, hardly narrowed at base, acute, not acuminate; flowers small, solitary, white or pale rose, on short peduncles. The fruits, in the plate, are small and suburceolate, certainly not "perfectly globular," as Mr. Baker says. They are much smaller than an average acorn, measuring 4–5 lines by $3\frac{1}{2}$–4 lines; but their shape is well described by Acharius. The styles are short and hispid, not woolly.

This species has been very greatly misunderstood, and I am not sure in this case whether the errors of foreign have not been more marked than those of British botanists. The latter, for the most part, apply the name to any small-leaved, uniserrate, glabrous rose with small globose fruit, which perhaps is not unjustifiable with our restricted list, but there are closely allied plants on the Continent which might be mistaken for it. But there are in the British collection, as with all species and varieties, some specimens which could not possibly be *R. senticosa*, nor even Mr. Baker's interpretation of it. Foreign botanists lay great stress in their descriptions on the leaves being in fascicles of 4-6 at the ends of the branches. The only justification for this seems to be that in Acharius's plate there is one cluster of two and one of three leaflets, but this is surely an accidental case of arrested development, which may frequently be noticed in many varieties.

Foreign specimens, though they show a great variety of prickles, have them usually straight and subulate, a character usually ignored by British botanists. The leaflets, though usually small, are very often considerably narrowed below and longly acuminate at the apex, thus not agreeing either with Acharius's description or plate. They appear to be frequently folded along the midrib. The fruits are rarely globose, but almost always larger and longer

than figured by Acharius, thus going to the other extreme that British botanists do who assign globose fruit to the species. There is a specimen from Gay's herbarium at Kew, named by Wallroth, to whom it was sent by Swartz. It agrees more nearly with Acharius's figure than any example I have seen, but its fruits are larger and more globose.

Crépin says that he has seen an author's specimen of *R. senticosa*, and that in his opinion it belongs to *R. glauca*. I have seen no other botanist express this view, and as I have not seen authentic specimens myself, I can only say that neither figure nor description, nor Gay's specimen at Kew, confirm this view. The stigmas, it is true, are said to be "in a subglobose head," but Acharius does not say whether they are also woolly, which is almost universal in all varieties of *R. glauca*, and they are not so in specimens. Déséglise calls them merely hispid.

Although frequently recorded from Britain, Déséglise has no British specimens, and does not record it as growing in this country, and though Crépin does not deny its existence here, the inference from his remarks on it in Journ. Bot. 1896, p. 180, is that it does not occur. I have, however, retained it provisionally in our list, as I am unable to make British plants so named agree with anything else, and it has been looked upon as native and fairly frequent for at least forty years.

Allied plants not recorded from Britain are *R. aciphylla* Rau, with similar habit and prickles, but even smaller leaflets, ½ inch by 2–3 lines, acute at each end, petioles somewhat hairy, leaflets often a little, sometimes quite biserrate. Also *R. canina* Linn. var. *ramosissima* Rau, with hooked prickles on stem, unarmed flowering-branches, broader rather large subobtuse irregularly serrate leaflets, broadly ovoid fruit, with sepals inclined to spread or rise.

Rosa sphærica

Grenier in Schultz Archives Fl. France, p. 333 (1855).

"Sepals stellato-patent, or scarcely reflexed, tubes globose, naked, as also are peduncles. Fruit spherical. Leaflets oval, acute, glabrous on both sides and on edges, light green above, subglaucescent beneath, and simply serrate. Petioles glabrous, with strong prickles. This plant has close alliance with the preceding [*R. opaca* Gren.], as well as with *platyphylla* [Rau]. It is separated from the latter by its leaves being entirely glabrous and by its spherical fruit. It is separated from the former by its leaves being light green, and glabrous on nerves and edges; its leaflets are oval, more elongate, with strongly prickly petioles. Its stem-prickles are stronger, and scarcely lower than broad at the base. Its fruits are all spherical, except the central one, which is turbinate."

Grenier's description being rather meagre, I append that of Déséglise in "Essai Monographique," in Mém. Soc. Acad. de Maine-et-Loire, x. p. 104 (1861):—"Straight, with robust, dilated, arched prickles. Petioles with *scattered hairs at the insertion*

of the leaflets, the rest glabrous, prickly. Leaflets 5–7, oval acute, light green above, rather glaucous beneath, glabrous, firm, *simply toothed*, all petioluled, terminal rounded at base, acute or ending in a little point. Stipules *lanceolate, a little toothed*, glandular at tips. Peduncles short, glabrous, solitary, or in a small corymb, shorter than leaves and almost hidden in bracts. Calyx-tube *rounded*, glabrous. Sepals pinnatifid, glabrous, tomentose on edges and within, salient in bud, reflexed, deciduous. Styles hispid in a *short bundle*. Flowers rose. Fruit erect, coriaceous, *globular, a little attenuate at base*.—Differs from *globularis* in straight branches, petioles not glandular. Leaflets simply serrate, no secondary glandular teeth. Stipules lanceolate; fruit a little narrowed at base. From *canina* in somewhat hairy petioles, and globose fruit, a little narrowed below."

A sheet in herb. Déséglise named by Grenier agrees very well with his description, and with the more detailed one of Déséglise, but it is not a good specimen. The prickles are short, but stout, straight, and conical. The leaflets are close set, of medium size, broadly oval, coarsely and quite simply serrate; one or two of the petioles are slightly hairy at the insertion of the leaflets, others are quite glabrous, and all are quite eglandular, as also are the broad stipules, bracts, and spreading sepals. The peduncles are solitary. The fruit is quite globose, or even retuse at base, and I have not seen a specimen "a little attenuate at the base," which Déséglise repeats three times. The sepals are much pinnate. The styles are hispid. Grenier says the central fruit is turbinate, but this also I have not observed. One or two sheets not named by Grenier have quite hairy midribs, which are exceedingly rarely found in this group, and I can hardly believe that Déséglise intended to retain them in this cover.

There are only two specimens in herb. Déséglise from Britain. One collected by Webb at Hoylake, Cheshire, and labelled by him, "near *sphærica*," has the leaflets decidedly narrower and the fruit more ovoid than usual. The other, collected by Briggs at Kingsmill, Cornwall, and labelled "? *R. sphærica*," also has rather narrow leaflets, but perfectly globose though rather small fruit. The styles are densely hairy in both, which agrees with what Baker says about them. Its author does not mention styles, but his specimen has them hispid, as Déséglise describes them, not densely so; in all specimens, however, both British and foreign, the styles vary from densely hispid to almost glabrous.

Mr. Baker, in his Monograph, says this "differs only from *lutetiana* by its broader leaflets, more rounded at the base, slightly pubescent petioles, globose fruit 7–8 lines broad and deep, and more villose styles."—As already stated, the hairiness of the styles is a weak character, the breadth of the leaflets is very variable (it is odd that both the British specimens in Déséglise's herbarium should have narrow leaflets, though both were named with doubt), the hairiness of the petioles is unreliable, and at best is a character of only very secondary importance, so we are left with the globose fruit as the main feature of this plant. This will, I think, dis-

tinguish it from any other British variety of the group, especially when taken in conjunction with the rising sepals; but there are about half-a-dozen species recognized on the Continent, and likely to occur in Britain, with globose fruit, of which the one that most resembles *R. sphærica* is *R. globularis* Franch. This is distinguished on paper by its irregularly serrate, or even biserrate, leaflets, though quite a considerable number of specimens have them simply serrate. It is a dwarfer plant than *R. sphærica*, smaller in all its parts except the leaflets, which are rather large and more lanceolate. The petioles also are usually, or at least more often, glandular. There are other differences in description, but they seem of small importance, and do not stand the test of specimens. But if we preserve a distinction between uniserrate and biserrate leaflets, I feel sure we shall have to include *R. globularis* Franch. in our list. From my own diagnoses I make it out to be more frequent than *R. sphærica*, but do not include it until it is confirmed by good authority.

Rosa syntrichostyla

Ripart MSS. ex Déséglise in Catalogue Raisonné du Genre Rosier p. 143 (1877).

"A low shrub, with flexuose branches, bark green, stem-prickles strong, dilated at the base, hooked, those of the flowering branches smaller, thin, elongate, dilated at the base in the form of a disc, the smallest straight. Petioles glabrous, *very lightly villous above at the base*, with some scattered fine glands, furrowed above, prickly beneath. Leaflets 5–7, all petiolulate, the terminal rounded or a little narrowed at the base, glabrous, *deep green above*, paler beneath, oval-acute or oval-elliptic, some obtuse, simply dentate, the lower leaflets with some rare accessory teeth, sometimes 1–3 small acicles on midrib of terminal leaflet. Stipules more or less broad, glabrous, bordered with glands, auricles acute, divergent. Peduncles smooth, solitary, or in a corymb, with glabrous, lanceolate, or oval-cuspidate bracts at their base, as long as, or longer than, the peduncles. Calyx-tube ovoid, glabrous. Sepals appendiculate at the tips, glabrous, two entire with tomentose edges, three pinnatifid with narrow appendages, salient in bud, equalling the corolla, reflexed after flowering, not persistent on the fruit. Styles free, *very villous*, *simulating a more or less salient column*. Disc conical. Flowers *white with yellow claw*. Fruit *small*, ovoid, red when ripe."—He adds that Ripart wrote him saying that it belongs to the group *R. systyla*, but Déséglise points out that the styles are free in Ripart's own specimen; moreover, Ripart, though he places this in his Section *Systylæ* of his key, remarks therein that it and most of its allies may equally well be placed in the next Section (i.e., *R. canina* sensu lato), as their styles are merely agglutinated, and not truly united.

I cannot trace that Ripart ever published a description of this or of any other species himself. His key, referred to on p. 8, only

runs the species down to groups, not to individuals, so that I imagine the laws of nomenclature should exclude him as the authority for species after which his name appears. In many cases, however, Déséglise, who published most if not all of Ripart's species, states that his description was drawn up from notes supplied by Ripart, and in a few instances he quotes his name after his own as joint author. The assumption therefore is that Ripart and Déséglise worked conjointly, even when only the former's name is quoted; and as Ripart's name has been accepted for years by botanists, both British and foreign, this is not the place to make any alteration.

I have seen a specimen of Ripart's gathering in herb. Déséglise, which may have been his type, as it contains the note Déséglise refers to, *viz.*, "C'est un *systyla* à pédoncles glabres, et à colonne de styles velues, laineuses, feuilles simplement denteés." Its leaflets are small, elliptical-acute or slightly acuminate, toothing very nearly but not quite simple, and not more irregular than in several examples of *R. lutetiana* Lém., while at the same time not more simple than in many examples of the biserrate subgroups. Petioles slightly glandular, glabrous or very slightly hairy at nodes. The fruit is small and ovoid, in accordance with the description, but other specimens, not of Ripart's gathering, show a more subglobose form. The styles are not very woolly, scarcely more than hispid, prominent but quite loose. Disc conical. Sepals much pinnate, some of the pinnæ gland-tipped.

The majority of foreign specimens can be distinguished from others of this subgroup by the long, very white woolly styles, but several of the specimens in herb. Déséglise have them quite short, though still woolly, while specimens can be found in the *R. canina* (*lutetiana*) cover with styles at least as woolly as the less densely clothed examples of *R. syntrichostyla*. Other distinguishing points are strong, often hooked prickles, a decided tendency to hairiness of petioles, though often they are quite glabrous, also some irregularity in the dentition, but this, again, does not appear in all examples. The leaflets and fruit are rather small, and the petals are white.

There are four British specimens in herb. Déséglise, all looking quite different from Ripart's specimen and from one another. One collected by Briggs at Weston Mill Lake, South Devon, and labelled by him "*R. glaucescens* Desv.?" has remarkably long narrow leaflets, quite irregularly serrate. The styles are neither long nor very woolly, though perhaps more so than in average *R. lutetiana*. A plant from Yealm Vale, Devon, by the same collector, labelled *R. senticosa*, has small subglobose fruit, rather large leaflets, and densely woolly but not prominent styles. The prickles look *systyla*-like, which takes it off *R. senticosa*. A third plant, collected by Briggs in Cornwall, has perfectly globose fruit with densely woolly styles, but in only one out of six fruits are the styles prominent. The leaf-toothing is irregular. A specimen collected by E. Jones, near Llansilio, Denbigh, and labelled "*R. canina*. var. *urbica*" by Baker, has the characteristic prominent

woolly styles of *R. syntrichostyla*, but I cannot see why Déséglise referred it to that species, because its leaflets have the midribs hairy, even if their unusual largeness was not an objection. I prefer to accept Mr. Baker's opinion, at least as to the group to which this specimen belongs, and would have referred it to *R. semiglabra* Rip.

Rosa flexibilis

Déséglise, Cat. Raisonné, p. 148 (1877).

"A shrub 3–5 ft. high, with flexuous trailing branches supported by the neighbouring shrubs. Stem-prickles numerous, robust, dilated at the base, *inclined or falcately curved at the tips*, equal, those of the flowering branches *rare*, *scattered*, smaller and of the same form. Bark greenish, that of the young shoots pruinose. Petioles glabrous, furrowed, with whitish scattered hairs in the furrow, prickly beneath. Leaflets 7, *dark green* above, not shining, all petiolulate, somewhat widely spaced on the petiole, *oval*, *oval-elliptic or rounded at the apex*, *narrowed at the base*, the lower smaller, sometimes obtuse, simply serrate. Stipules more or less broad, glabrous, bordered with glands; auricles acute, straight or divergent. Peduncles glabrous, *in a corymb of* 4, 8, 12, *or* 20, *or in a bifid or trifid cyme.* The corymb has at its base glabrous, oval, cuspidate bracts, with glandular edges; the trifid cymes have at their base two opposite bracts, the exterior peduncles bearing two small bracts, the middle peduncles none; the bifid cymes have the same bracts, but only one peduncle bears two bracts, the other none. Calyx-tube ovoid, glabrous. Sepals oval, glabrous, spathulate at tips, two entire, three pinnatifid with broad ciliate appendages, salient in bud, shorter than the corolla, reflexed in flower, not persistent. Style *short glabrous*. Disc conical. Flowers rather large, white; stamens whitish with yellow anthers. Fruit red, ovoid, the central ones of the cymes obovoid."

This species, which seems to be uncommon on the Continent, rests on weak characters, and is only introduced into our list on strength of the Yorkshire specimen identified by Déséglise. Its author credits it with a peculiar trailing habit, which would not be evident in dried specimens, though perhaps of more value in the field than is apparent on paper. The number of flowers in a cluster, as has already been pointed out (p. 6), is not a reliable character, and the character of "glabrous styles" breaks down on examination of specimens, which show the styles to vary considerably from glabrous to quite hispid. Even the shape of the leaflets in the author's description does not agree with that of specimens collected and named by himself, which show them to be quite rounded or even emarginate below, and either very acuminate or at least cuspidate at the apex. The peduncles in his specimens are in clusters of three to six, and are rather long, while fruits are decidedly narrow.

Mr. Baker's specimen in herb. Déséglise is from Sowerby, Yorks. It has glabrous styles, quite narrow leaflets on rather

long petioles and ovoid fruit. The only difference from *R. lutetiana* Lém. seems to be its glabrous styles.

ROSA MUCRONULATA

Déséglise, Cat. Raisonné, p. 146 (1877).

"A low shrub with flexuous branches, prickles dilated at the base, *some straight, others a little arcuate*, rather robust, those of flowering branches smaller. Petioles glabrous, *with scattered hairs* chiefly at the base and furrowed above, prickly or unarmed beneath. Leaflets 5–7, all petiolulate, *small, oval-elliptical*, acute, mucronate, green, a little shining, glabrous, simply toothed, the teeth acute, the upper connivent. Stipules glabrous, bordered with glands, auricles acute, some straight, others diverging. Peduncles usually solitary or in pairs, glabrous, with two oval cuspidate glabrous bracts at their base, bordered with glands and *longer than* the peduncles. Calyx-tube ovoid, glabrous. Sepals appendiculate at tips, glabrous, the inner entire with tomentose borders, the outer pinnatifid with narrow appendages, salient in bud, shorter than the corolla, reflexed in flower, deciduous. *Styles glabrous*, rising above the rather conical disc. Flowers rose. Fruit ovoid, red."

Déséglise quotes an earlier description of his plant by Godet in Flora du Jura, Suppl. p. 71 (1869), which he says was drawn up by Godet from a specimen sent by Déséglise to Grenier, labelled provisionally *R. mucronulata* Déségl. Doubtless it was incorrectly so labelled, but at least Déséglise says that Godet's description is wrong in giving it biserrate leaflets. Why in that case he quotes Godet's description at all as the earliest authority I cannot say.

This species appears to be well marked by its small leaflets and glabrous styles. I should not describe the leaflets of the majority of specimens as mucronate; they are acute, or even acuminate. Their teeth are sharp, moderately deep, and much directed forward. Its fruits are large and ovoid, never globose.

The only British example in herb. Déséglise is one collected near Thirsk by Mr. Baker and not named by him. It has small leaflets, acute at each end, quite simply serrate, with quite eglandular petioles. All the prickles are small, straightish, and subconical. The flowering branches are quite short, but the fruit being ovoid no doubt accounts for Mr. Baker not naming it *R. senticosa*. Its styles are not all quite glabrous, though some are so.

This species and *R. flexibilis* Déséglise are the only ones of the group in the British list which are said to have glabrous styles, but, as already pointed out, others may have them abnormally so, while *R. flexibilis* may have them more or less hispid.

FOREIGN SPECIES OF SUBGROUP I.

Besides the four already dealt with (*R. fallens* Déségl., *R. aciphylla* Rau., *R. canina* var. *ramosissima* Rau., and *R. globularis*

Franch.) the Continental distribution of the following render it probable that some of them may be found in Britain :—

Styles hispid (not woolly) :—

Fruit globose :—

R. analoga Déségl. Large ; almost unarmed. Leaflets large, obovate. Peduncles long (near *R. sphærica* Gren.).

R. dilucida Déségl. & Ozan. Leaflets rather large, shining, obovate. Flowers rose or bright rose. Sepals rising.

R. montivaga Déségl. Small, very reddish. Leaflets small. Peduncles short. Styles densely hairy. (Connects this group with *R. glauca* Vill., which it much resembles.)

Fruit ellipsoid :—

R. Touranginiana Déségl. Leaflets large, broad, sometimes suborbicular. Fruit large and long.

R. insignis Déségl. Leaflets elliptical, irregularly serrate (usually classed as biserrate). Fruit large and long, narrowed each end. Peduncles very short.

Fruit ovoid :—

R. oxyphylla Rip. Small. Leaflets very small, much narrowed at each end. A close ally of *R. mucronulata* Déségl. but with hispid styles.

R. separabilis Déségl. Tall. Prickles almost entirely absent. Leaflets medium or small, longly acuminate. Peduncles long. Fruit obovoid or roundish ovoid. (An unsatisfactory species.)

R. spuria Pug. Very like *R. montivaga* Déségl. in red colouring and size of leaflets, but fruit quite ovoid or even ellipsoid, and styles thinly hispid.

Style glabrous :—

R. albolutescens Rip. Tall, with yellowish green foliage, and long, very floriferous branches. Flowers very white, though with yellow claw.

R. macroacantha Rip. Small, with long flaccid branches. Prickles very long and straight. Peduncles long. Fruit small and narrow.

R. nemophila Déségl. & Ozan. Tall. Prickles straightish. Leaves dark green. Styles in a fascicle, not always quite glabrous. (Liable to be mistaken for a variety of *R. stylosa* Desv.)

R. rhynchocarpa Rip. Fruit much contracted below disc, so as to be almost beaked. (Described as a variety of *R. dumalis*, but its leaflets are practically uniserrate.)

Subgroup ii. Leaflets biserrate, eglandular on secondary nerves beneath. Peduncles eglandular.

Key to British Species.

1 { Styles glabrous, often protruded. Leaflets and fruit rather small *R. Chaboissæi* Gren.
{ Styles hispid 2
{ Styles woolly or densely hispid 3

2 { Strong, reddish. Leaflets large. Peduncles clustered *R. malmundariensis* Lej.
Medium. Leaflets feebly biserrate. Peduncles solitary, or nearly so. *R. dumalis* Bechst.

3 { Sepals spreading, often suberect. Styles short. Leaflets with prominent veins beneath ..... *R. biserrata* Mér.
Sepals reflexed. Styles rather long. Veins of leaflets not prominent. *R. eriostyla* Rip. & Déségl.

Rosa dumalis

Bechstein, Forstbotanik, p. 227 (1810).

I have not been able to obtain access to the first edition published in 1810, and the following is extracted from the second, dated 1843, p. 156:—"Fruit mostly solitary, ovoid, smooth. Sepals long, smooth, pinnate. Leaves smooth, oval, pointed, doubly toothed. Petioles glabrous, also ribs. Petioles and stem with scattered somewhat hooked prickles." The following is also abridged from p. 582 of the same edition:—"A somewhat smaller, denser, and more spreading bush than the dog-rose. Old stems rusty brown, or greyish. Young twigs either wholly greenish, red-brown, or dull green on the shaded parts, and shining red-brown in the sun, smooth and whitish only on one or two side shoots, brown-yellow when old, rose-red when young. The leaves are unequally incised, shining and smooth above. Petioles with scattered glands in the upper part, with a long naked part and with broadly subulate prickles. Stipules thickly red-glandular. Leaflets usually five, 1–1½ in. long by ½–¾ in. broad, roundish oval, shortly subacute, deeply and sharply both singly and finely doubly serrate, with red glands on the teeth, smooth both sides, dark green above, dull green beneath. **Flowers 1–3, on peduncles** of medium length. Calyx-tube and sepals smooth, whitish inside and the shape of those of *canina*. Petals rose-red, emarginate. Fruit ovoid, roundish, inflated, large, sometimes rounded below, little pointed above. Sepals mostly persistent, spreading."

Mr. Baker's description in Review, p. 25, is as follows:—"Habit of growth and prickles of normal plant. Leaves full green or glaucous, not flat, firm, glabrous on both sides; terminal ovate, narrowed or somewhat rounded at base, the serrations neither so numerous nor so close as in *lutetiana*, each or several with 1–3 gland-tipped teeth. Petioles more or less setose, and not hairy or very slightly so, but with 3–4 hooked aciculi. Stipules and bracts naked on the back but closely setoso-ciliate. Peduncles naked. Calyx-tube and fruit varying from ovate urceolate to subglobose. Sepals leaf-pointed and fully pinnate, naked or slightly hairy on back towards edges, and more or less densely setoso-ciliate. Fruit as in last [*lutetiana*]. Styles hairy, sometimes a little protruded."

Déséglise's description in "Essai Monographique," p. 111, is essentially the same as Mr. Baker's, but supplements or slightly differs from it as follows:—"Petioles somewhat *pubescent and glandular* with *broad* stipules, the upper dilated; large bracts hiding the rather short peduncles. Leaflets rather large. Calyx-

tube *ovoid*. Fruit roundish ovoid, not globose. Styles hispid in a short bundle. Flowers pale rose or white." He adds that it differs from *R. biserrata* in the leaves not being dark green, the nerves not salient, fruit ovoid and sepals not erect.

It will be noticed that descriptions do not give this species strongly biserrate leaflets. Bechstein's short diagnosis says they are doubly toothed, but in his full description he says "unequally incised," also "both singly and finely doubly serrate." Mr. Baker also says, "each [tooth] or several, with 1–3 gland-tipped teeth," which does not imply strong double dentition, and the majority of specimens, greatly though they vary, bear this out; for the most part each main tooth has from one to two secondary teeth, and it is more rare to find all the teeth with two or three secondary ones than to find them barely more than irregularly serrate. The secondary teeth are usually gland-tipped, but not always so, though the glands are relied upon by some authors to distinguish this species from the more irregularly serrate members of the last group. The petioles are sometimes slightly hairy, and almost always somewhat glandular, and though they are said to be more so than in the last group, this is by no means always the case in specimens. Occasionally the glands extend to the midrib, but never to the side nerves. The peduncles vary greatly in length, but are generally from ½ to 1 inch. The fruit is ovoid, very like that of *R. lutetiana*, but on the whole is more inclined to a globose than to an ellipsoid form; it is of medium or rather small size. Bechstein says the sepals are "mostly persistent or spreading," a character no other author seems to have repeated. In specimens they are usually more loosely reflexed than in *R. lutetiana*, but rarely rise as high as the disc, which is what I understand by "spreading," and they do not appear to be persistent. I have not seen a type of Bechstein's, nor, so far as I am aware, have the other authorities I have consulted, so I cannot say whether his specimens bear out his description of the sepals, but the point does not appear to be observed by modern authors.

To sum up, my impression from specimens named by good rhodologists is that *R. dumalis* Bechst. has medium to rather large leaflets, the teeth mostly with 1 or 2 (rather rarely 3) somewhat glandular secondary teeth, petioles usually, not always, glabrous, usually slightly but rarely much glandular. Peduncles of moderate length. Fruit ovoid to ovoid-subglobose, medium or small. Sepals sometimes only loosely reflexed, not much glandular on edges, or not at all. Styles hispid, rarely densely so, still more rarely subglabrous, often somewhat exserted.

There are ten specimens collected by Mr. Baker in herb. Déséglise. They vary quite as much as the Continental ones in their characteristics, which it would not be profitable to detail. Crépin (Journ. Bot. 1896, p. 214) says that Mr. Baker's No. 15 belongs to the group *R. glauca* Vill., and corresponds to var. *celerata* Baker. Now var. *celerata* comes under *R. coriifolia* and not under *R. glauca*, because its leaflets are hairy beneath, and I can see no ground for transferring Mr. Baker's No. 15, which I have seen, to

R. glauca, of which it has neither the dilated stipules nor the densely woolly styles, nor does it at all accord with my idea of *R. celerata* Baker. Its leaflets are almost simply serrate, but this does not affect the question of group.

Forms or, as many think, synonyms of *R. dumalis* Bechst. are as follows :—

R. stipularis Mér. has exceptionally dilated stipules.

R. glaucophylla Winch has glaucous leaflets. Crépin (*loc. cit.*) thinks this is a variety of *R. glauca*, which is quite possible. The styles in the specimens I have seen are a good deal hispid but hardly woolly enough, nor the stigmas sufficiently capitate for that group.

R. sarmentacea Woods seems to me, for the most part, to cover the more strongly biserrate, glandular toothed and petioled forms, but one or two so named by Woods are subsimply toothed and quite as eglandular as ordinary *R. dumalis* Bechst. Crépin (*op. cit.* p. 181) says that the name covers nothing but a collection of diverse form which have nothing in common except more or less glandular serrate teeth and smooth peduncles.

R. erythrella Rip. seems to be merely a form with very large bright rose flowers.

R. rhynchocarpa Rip. has subglabrous styles and beaked fruit. Neither of the last two mentioned have been recorded as British.

Rosa biserrata

Mérat, Flore de Paris, p. 190 (1812).

"Stem 3–4 feet. Prickles curved, with base longer than their height. Leaflets oval, rather large, doubly serrate, each tooth glandular. Petioles glabrous, as also are leaves, little or not prickly, and little glandular. Stipules very glandular. Peduncles and fruit glabrous, the latter globular. Sepals almost simple, very glandular. Fruit large. Flowers solitary, pale rose."

Déséglise, in "Essai Monographique," p. 112, has :—"Rather tall. Prickles strong, dilated at base, curved or hooked. Petioles more or less *pubescent at base*, *glandular*, prickly. Leaflets 5–7, all petioluled, firm, coriaceous, dark green above, *nerves very salient below*. Terminal rounded at base or acute at each end, *biserrate with glandular teeth*. Stipules gland-fringed, *upper broadly oval, dilated*. Peduncles short, smooth, one to several. Bracts oval, as long as peduncles. Calyx-tube smooth, ovoid. Sepals pinnatifid with linear appendages, *bordered with stalked glands*, reflexed in flower, then *erect* on fruit, but not persistent. Styles short, very hispid. Disc conical. Flowers rather large, light rose. Fruit rather large, roundish.—Differs from *dumalis* in dark green leaves with very prominent veins. Fruit roundish, with erect sepals."

Mr. Baker does not describe this species separately, but introduces it into his Monograph as a synonym of his *R. vinacea*. He says :—"Scarcely different from the last [*dumalis*], but the serratures open and very compound, the petioles more glanduloso-

setose, and the glands extending a little to the midrib beneath. Déséglise's plant [i. e. *biserrata*] has globose fruit."

As in other species, book characters are not well represented in herbarium specimens, but I have not seen any collected or named by Mérat, so can only consider those by the best of the more modern collectors. Most descriptions call attention to the strong biserration of the leaflets, with much glandular development on their teeth, stipules, bracts, and sepals; but Déséglise, while mentioning these characters in his description, does not call attention to them in saying how it differs from *dumalis*. Although there are in herb. Déséglise specimens named by botanists of repute, in which these points are well-marked, the majority, even many of them named by the same botanists, do not present them. Characters which appear to be of more importance are the globose fruit and very hispid almost woolly styles. Other characters are loosely reflexed sepals, seldom rising above the disc, and very rarely erect, as Déséglise says. They are, as a rule, not much pinnatifid. The peduncles also are short, and leaflets of medium size.

There are no British specimens in herb. Déséglise, and of those labelled *R. biserrata* in the British collection, few, if any, seem correctly named. The characters of globose fruit, and very hispid or woolly styles seem to have been completely overlooked. Mere glandular development and mere compound serration are not sufficient nor even necessary to distinguish specimens from *R. dumalis*. Still, in a genus in which so much latitude is tolerated in its species I hesitate to go further than to suggest that the existence of *R. biserrata* Mér. in Britain requires confirmation. It may be mostly *R. vinacea* Baker, and glandular forms of *R. dumalis*.

A specimen at Kew, collected by Léman (in France?), has the petioles pubescent at the base, but only slightly glandular. The leaflets, which are somewhat narrowed below, are not at all strongly glandular on the teeth, not at all so on the midrib, but the nerves are all remarkably salient. The stipules are very little gland ciliated. The fruit is of medium size but ovoid. The sepals are remarkably hispid on the back, and quite erect. The styles are very hispid. Except in the shape of the fruit (and there is only one and that does not look well formed) this specimen agrees remarkably with Déséglise's description.

Another specimen from Desvaux, labelled "*R. biserrata* Mér., *R. macrocarpa* Desv.," is very similar, but the teeth of the leaflets are quite eglandular, and the fruit is much larger.

Rosa malmundariensis

Lejeune, Flore Env. Spa, p. 231 (1811).

"Fruit ovoid. Peduncles ordinarily glabrous, sometimes with glandular hairs. Sepals very glandular. Stem and petioles with recurved prickles. Flowers usually in threes. Leaves glabrous. Stipules glandular. Flowers rose." In his Review of the above

work, p. 79 (1824), he says: "Ovate fruit and peduncles glabrous. Leaves glabrous, biserrate, teeth glandular serrate. Stem prickly."

Déséglise, in "Essai Monographique," *l. c.*, p. 107, has:—"Rather tall, tufted, with recumbent branches, young branches glaucous and reddish. Prickles strong, much dilated, curved, geminate. Petioles *lightly pubescent, and with stalked glands*, prickly. Leaflets oval-roundish or oval-acute glabrous, firm, green above, glaucescent beneath, slightly veined, doubly gland-serrate. Stipules glabrous, a little dentate, glandular on edges. Auricles diverging. Peduncles glabrous, reddish, 5–11, the middle ones shorter. Bracts ovate, glabrous, glandular edged, as long as, or shorter than the peduncles. Calyx-tube glabrous, *red*, *ovoid*. Sepals glabrous, *glandular*, salient in bud, but shorter than open corolla, reflexed and deciduous. Styles hispid, in a short bundle. Disc nearly flat. Flowers rather large, fine rose. Fruit *large*, *round*."

I have seen no specimens collected or named by Lejeune, but, judging from foreign specimens by other collectors, this species appears to be a luxuriant glandular form of *R. dumalis*, with the young shoots and other parts often strongly tinted with red. The leaflets are large, more biserrate, and more glandular toothed than in *dumalis*, with the petiole more glandular, and more often hairy. The flowers are almost always in considerable clusters, and very rarely a gland or two may be found on the peduncles. The fruit is rather large, and varies a good deal in shape, so that the author's "ovoid" and Déséglise's "round" are both covered. The sepals are usually well developed and strongly appendiculate. The author and Déséglise describe them as "very glandular" or "glandular," presumably on the back. Mr. Baker also lays stress on this point in his Monograph, p. 226. To test the point I examined thirty-two specimens in Déséglise's herbarium, rejecting any at all doubtfully named. Of these, eighteen had the sepals almost eglandular, even on the edge; eight were more or less glandular ciliate, but not glandular on the back; and of the six with glands on the back, two or three showed only minute glands like the micro-glands beneath the leaves referred to on p. 5. In spite of this, there is no other character in Lejeune's description by which the plant could be distinguished from *R. dumalis*.

There are three British examples in herb. Déséglise. One collected by Briggs near Plymouth and labelled by him "*? biserrata ? vinacea*" has medium-sized narrow leaflets, not very strongly biserrate. Petioles very glandular. Sepals strongly gland-ciliate, but not glandular on the backs. Another specimen by him from Egg Buckland, labelled "*R. dumalis?*" has decidedly larger, broader leaflets, less doubly serrate, but otherwise it is similar to the Plymouth specimen, except that the sepals are glandular also on the backs, as much so perhaps as any Continental example. A specimen from Mr. Baker (collected by Hailstone?), from Wood Newton, Yorks, is like the last, but the leaflets are strongly biser-

rate, and though somewhat larger are narrower in proportion. The sepals are only micro-glandular on the backs.

Rosa eriostyla

Ripart & Déséglise Cat. Raisonné, p. 165 (1877).

"A low shrub, prickles more or less numerous, inclined or straight, dilated at the base. Petioles almost unarmed, with scattered hairs and glands. Leaflets 5–7, oval, oval-elliptic, the lower generally subobtuse, glabrous, doubly serrate, the secondary teeth usually glandular. Stipules glabrous, auricles erect or slightly diverging, bordered with glands. Peduncles glabrous, solitary or 2–4 together. Bracts oval cuspidate, glabrous, longer than peduncles. Calyx-tube ovoid, glabrous. Two sepals entire with tomentose edges, three pinnatifid with linear appendages, bordered with glands, salient in bud, equalling the corolla, reflexed, not persistent. Styles free, very villous, like a short column. Disc a little conical. Flowers light rose. Fruit globose, or the central ones of the clusters obovoid."

Although, judging from the number of specimens in herb. Déséglise, this must be a fairly common plant on the Continent, there are no specimens therein collected by either author. The others have prickles of moderate size and normal form, that is, neither much hooked nor particularly straight. The flowering-stems are more often unarmed than prickly, though descriptions do not mention this. The petioles vary from thinly hairy and moderately glandular to glabrous and smooth. The leaflets are medium or rather large, usually moderately biserrate and teeth not much gland-tipped, but sometimes the leaflets are subsimply toothed. The fruit is never large, and varies from globose to ovoid. The styles are always densely woolly, but not by any means always very prominent "like a short column," and the disc appears to be more often flat than conical.

There are three British specimens. One collected by Mr. Rogers at Bovey Tracey, and not named by him. It is placed here by Déséglise with some doubt. The styles are not so densely woolly as usual. The fruit is ovoid on short peduncles, and the sepals show a decided tendency to rise after flowering. Another unnamed specimen by Mr. Rogers, from Chudleigh Bridge, South Devon, has long, slender, nearly straight prickles, unlike any other specimen in the cover. The leaflets are of medium size, rather strongly biserrate, somewhat glandular on midribs, and decidedly so on petioles. The fruit is small and subglobose on short peduncles, and the styles are characteristically long and densely woolly. In spite of the abnormal prickles, Déséglise expressed no doubt about this specimen. The third example is by Webb, from Menai Straits, and labelled by him *R. dumalis*. It has rather large elliptical, strongly biserrate leaflets, well spaced on the petiole. The teeth are not much glandular, nor is the petiole. Only one fruit is formed; it is small and subglobose. The styles are densely white-woolly.

Rosa Chaboissæi

Grenier, Fl. Chaine Jurassique, p. 241 (1864).

"Petioles pubescent, glandular, and prickly. Leaflets more or less pubescent below, biserrate, the secondary teeth glandular. Peduncles glabrous, pubescent, or hispid glandular. Calyx-tube ovoid. Flowers white or rose. Styles glabrous, close together or united in a column. Fruit ovoid.—Belongs to *systyla* by its styles, but to *biserrata* or *dumalis* by its leaves."

This is an exceedingly troublesome and ambiguous species, and as Déséglise did not publish his own description, as he did of most of the French species, it is difficult to see what his views were. Even confining ourselves strictly to Grenier's description, it is very indefinite, at least as to the peduncles. Moreover, he clearly says, "leaflets pubescent below." No other author admits this character, though why they disregard it I cannot say. I have, however, seen a specimen at Kew collected and named by Grenier. It is a very poor example, barely more than in bud. The leaflets are elliptical, rather small, narrowed below, rather longly acuminate, and *quite glabrous below*. They are moderately biserrate, and the teeth are not much gland-tipped. The petioles are *glabrous*, moderately glandular, and scarcely aciculate. The prickles are moderate and curved. Stipules and bracts broad. Peduncles short, smooth, glabrous. Styles *slightly hairy*.

Another specimen in herb. Déséglise has Grenier's own note upon it, that it is *identical* with his species. In this the leaflets are of medium size, close-set on the petioles, broadish and exceptionally strongly biserrate, but the teeth are not at all strongly glandular, glabrous beneath. Petioles a good deal glandular and rather unusually hairy, but the hairs do not in the least reach the midrib. The fruit is small and ovoid or ellipsoid, styles quite glabrous, not long. Sepals not much, often not at all, gland-ciliate. Peduncles smooth. This agrees with his description except that the leaflets are not pubescent below.

French botanists appear to have disagreed considerably about this species, but in all cases they regard it as a *Canina*, not as a *Stylosa*. The chief point of dissension lies in the styles. Lloyd says he has cultivated *R. Chaboissæi* Gren., and that it has hairy styles, sometimes in a column. Déséglise and Rouy consider it to be synonymous with *R. leiostyla* Rip., which has glabrous styles in a column, though Déséglise says they are very short. Déséglise's key characters of *R. Chaboissæi* Gren. are: "Styles entirely glabrous; petioles glabrous; leaflets oval, with acute teeth; calyx-tube ovoid; flowers rose"; its nearest allies being *R. Carioti* Chab., with roundish oval leaflets and white flowers, and *R. oblonga* Déségl. & Rip., with ovoid elongate calyx-tube, rose flowers, and obscurely hispid styles. Finally, we have Déséglise's herbarium, from which he quotes his Nos. 62 and 62*bis* as types. No. 62*bis* is very similar to Grenier's own specimen referred to above, except that it has rather small oblong obovoid fruit, and

decidedly hairy styles, somewhat projecting. His No. 62 has medium-sized leaves, rounded below, acute or acuminate, and fully biserrate. Petioles slightly hairy and glandular, with two or three prickles. Fruit small ovoid. Styles subglabrous.

No other British species of this group has normally glabrous styles, but in the field one quite frequently meets them in examples which obviously belong to the *Biserratæ*, yet if all these were labelled *R. Chaboissæi* Gren., a very heterogeneous collection would result; while if hairy styles were admitted, as Lloyd and Déséglise appear to do, the confusion becomes greater still. I think, therefore, it is best to regard *R. Chaboissæi* Gren. as having quite glabrous styles, often protruded, rather small glabrous, much biserrate leaflets and small ovoid fruit.

There are three British specimens in herb. Déséglise. Mr. Baker's No. 33, from Thirsk, is unarmed. Leaflets small and longly acuminate, not strongly biserrate, primary teeth deep. Petioles slightly hairy. Stipules long, reaching lower pair of leaflets. Peduncles short. Fruit ovoid-subglobose. Styles almost glabrous. A specimen of Webb's from Menai Straits, labelled *R. dumalis*, is very like Mr. Baker's. The flowering-branches are short and unarmed, petioles glabrous but more glandular than in the Thirsk plant; styles quite glabrous. A plant by Messrs. Groves from Mottisfont, South Hants, looks different. It was labelled by them "*R. virginea?*" Its leaflets are almost simply serrate, and petioles pubescent at the nodes. The fruits are in a cluster of seven, with rather long, quite free, decidedly but thinly hairy styles.

Foreign Species of Subgroup II.

The following species should be looked for in Britain :—

Styles glabrous or nearly so :—

Petioles pubescent, or at least some of them :—

R. medioxima Déségl. Leaflets suborbicular, rather large. Flowers bright rose. Fruit ovoid.

R. villosiuscula Rip. Leaflets oval, rather small. Flowers light rose. Fruit subglobose. (There is a British specimen in herb. Déséglise, and two named by him at Kew; but all three have hairy midribs and side nerves, which are not permissible, so I have ventured to exclude them. Boulller calls attention to similar plants on the Continent, and says they belong to his *R. villosiuscula* var. *Beugesiaca* Boull., which may be the correct name of our British forms.)

Petioles glabrous or only slightly pubescent at nodes :—

Flowering-branches unarmed or nearly so :—

R. stenocarpa Déségl. Small shrub, with trailing stem and short, nearly unarmed branches. Fruit small, slender, ellipsoid.

R. cladoleia Rip. Almost wholly unarmed, otherwise like *R. dumalis* Bechst. Leaflets dark green. Flowers light

rose. (A specimen gathered by Messrs. Groves at Woking was placed to this by Déséglise, but with doubt, so I have not included it.)

R. glaberrima Dum. Prickles few. Leaflets large, pale green. Flowers white. Fruit ovoid-globose.

Flowering-branches prickly :—

R. Carioti Chab. Prickles numerous, hooked. Leaflets oval, roundish, subobtuse. Flowers white. Fruit urceolate.

R. oblonga Déségl. & Rip. Prickles straightish or curved. Leaflets small, oval, acute. Flowers rose. Fruit oblong on short peduncles. Styles not quite glabrous.

Styles villous :—

R. viridicata Pug. Leaflets rather small. Fruit small, ovoid, subglobose. Styles very long and free, woolly.

Styles hispid :—

Fruit subglobose :—

R. sylvularum Rip. Small, with small leaflets, straightish prickles, and rather small fruit. (Ripart, in his key, attributes hairy midribs to his species, in which case it cannot belong to this group. I follow Déséglise and others in placing it here.)

R. macrocarpa Mér. Tall, with large dull green leaflets. Fruit very large. Sepals rising.

R. sphæroidea Rip. Tall. Very like *R. biserrata* Mér., but leaflets shining. Styles not woolly.

Fruit ovoid or ellipsoid :—

Leaflets small :—

R. canina var. *squarrosa* Rau. Prickles numerous, long, straightish, conical. Leaflets much glandular-biserrate. Styles very hispid.

R. adscita Déségl. Prickles strong, *systyla*-like. Leaflets not much biserrate. Styles hispid.

Leaflets large :—

R. brachypoda Déségl. & Rip. Peduncles very short. Fruit large, obovoid.

R. insignis Déségl. Peduncles short. Fruit rather large, ellipsoid. Leaflets less strongly biserrate than last.

R. rubelliflora Rip. Lateral leaflets almost sessile, oval elliptic, not shining. Flowers bright rose.

R. rubescens Rip. Lateral leaflets petiolulate, oval acute, shining. Flowers bright rose. Very near last, and perhaps both may be regarded as bright rose-flowered forms of *R. dumalis* Bechst.

Subgroup iii. Leaflets uniserrate or biserrate, eglandular on secondary nerves beneath. Peduncles glandular.

Key to British Species.

1 { Prickles mixed with acicles at the tops of the flowering-branches *R. latebrosa* Déségl.
{ Prickles not mixed with acicles 2

2 { Leaflets simply or slightly doubly serrate 3
  { Leaflets fully biserrate 5

3 { Styles glabrous or nearly. Leaflets small, slightly biserrate *R. Lemaitrei* Rip.
  { Styles hispid. Leaflets large, quite simply serrate 4

4 { Shoots very stout, and glaucous. Prickles strong, hooked. Flowers in clusters. Some peduncles slightly glandular, some glabrous *R. surculosa* Woods.
  { Shoots not as above. Prickles straightish. Peduncles densely and often also fruit glandular ..... *R. andegavensis* Bast.

5 { Styles glabrous ..... *R. Suberti* Rip.
  { Styles hispid 6

6 { Peduncles and often fruit beset with spiny glandular or eglandular pricklets ..... *R. aspernata* Déségl.
  { Peduncles with more or less weak and often few glandular setæ. Prickles often in whorls 7

7 { Petioles glabrous. Leaflets glandular on midrib. Styles thinly hairy *R. inconspicua* Déségl.
  { Petioles hairy. Leaflets eglandular on midrib. Styles densely hairy *R. verticillacantha* Mér.

Rosa andegavensis

Bastard, Essai sur la Flore du Department de Maine-et-Loire, p. 189 (1809).

"Branching shrub with few scattered, straightish prickles. Leaves very glabrous. Petioles naked. Peduncles and fruit hispid. Flowers pale rose." In Supplement, p. 29, he adds: "Prickles on young shoots very often curved, whilst on the flowering-branches they are almost straight."

Déséglise in Schultz, *Archives de la Flore de France et d'Allemagne*, p. 334 (1855), writes:—"Tall branching shrub. Prickles robust, dilated at base, straight on flowering, hooked on sterile branches. Leaflets 5–7, elliptical, firm, glabrous, acuminate, coarsely toothed. Petioles glandular, prickly, the young with some hairs which disappear with age. Stipules narrow, glandular, with straight auricles. Peduncles solitary or few in a cluster, hispid with glandular setæ. Calyx-tube ovoid or oblong, glandular. Sepals pinnatifid, longer than buds, not persistent. Styles short, hispid. Flowers rose. Fruit ovoid."

Baker in Review, p. 31, says:—"Leaves firm, glabrous both sides, serrations sharp, connivent, simple. Terminal leaflet broadly ovate, somewhat rounded at base. Petioles not hairy, and only very slightly setose and prickly. Stipules and bracts glabrous on back, slightly glandular ciliate. Peduncles and base of calyx-tube rather closely aciculate and setose, the latter ovate urceolate or subglobose. Sepals pinnate and leaf-pointed, glandular and prickly on the back (Continental *andegavensis* has sepals usually naked on the back), but hardly at all glandular ciliate. Sepals reflexed after fall of petals. Styles villous."

Some British authors have regarded this species as simply a glandular-peduncled form of *R. lutetiana* Lém., to which perhaps

some of its forms might be reduced, but, as a rule, it presents distinct characteristics. Its main prickles (not only those on branches) are usually straightish and often rather slender. The petioles, though always glabrous, are a good deal glandular. The leaflets are widely spaced, and in typical forms are considerably narrowed to each end; they are almost always large. The toothing is coarse and open, not connivent, as in *R. lutetiana*. The peduncles are usually short and considerably glandular hispid. The fruit varies a good deal in shape. Its most common form is ovoid; it is also sometimes elliptical, but perhaps more frequently tends towards subglobose, though it usually is somewhat narrowed below so as to be broadly obovoid. It is very seldom urceolate. It is usually hispid-glandular at the base, and sometimes so all over. The sepals are usually more or less glandular on the back; they are rarely glabrous in Continental examples, as Mr. Baker says. The pinnæ are usually well developed, *i. e.* broad as well as often again incised. The styles usually project and vary considerably in hairiness; they are sometimes quite glabrous, in which case I do not understand why Déséglise has not placed the specimen to *R. agraria* Rip.

There is a specimen collected by Bastard in herb. Gay at Kew. It has prickles few, small and curved. Leaflets spaced on the petioles, of medium size, elliptical, and considerably narrowed at each end, rather openly simply serrate. Petioles glabrous, glandular, not prickly. Stipules not gland-ciliate. There is only one peduncle, which is short, glandular-hispid. Fruit ovoid, glandular-hispid all over. Sepals reflexed, considerably glandular on backs, pinnæ well developed. Styles hispid.

Déséglise, *l. c.*, quotes his own No. 17 as one of his types, but, as is frequently the case in other species, the specimen he cites appears to be considerably off type, in fruit and in leaflets at any rate. This No. 17 is only a small specimen. The leaflets are rather small and irregularly serrate, elliptical oval, not rather elongate-diamond-shaped as is usual. The petioles are glandular. The sepals are not, or are only very obscurely glandular on the backs. The peduncles are short, mostly in threes; fruit narrow, longish, rather hispid. Styles salient, thinly hairy.

There are no British examples in herb. Déséglise.

Déséglise, in Cat. Raison. p. 181, places the undermentioned five species after *R. andegavensis* with the remark: "*R. andegavensis* presents the following forms. We will not assign separate numbers to them, but without wishing by that to diminish their importance in the least." I am unable to see a reason for this treatment. It is true that except for *R. agraria* Rip. there is only a line or two of published description for each, but judging from specimens, they are just as remote from (or similar to) *R. andegavensis* as most species to which Déséglise does not give special treatment, while two of them have biserrate leaflets:—

R. agraria Rip. Leaflets less acuminate, uniserrate. Stipules large. Sepals glabrous on back. Styles glabrous or nearly so.

R. Lemaitrei Rip. Leaflets smaller, biserrate. Styles glabrous.

R. condensata Pug. More compact. Leaflets shorter, more obtuse, uniserrate. Stipules larger. Peduncles less hispid. Styles villous. Fruit rounded.

R. purpurascens Rip. Stems, stipules, and bracts reddish. Peduncles very slightly hispid. Flowers large, fine rose. Styles villous.

R. obtusa Rip. Leaflets biserrate. Calyx-tube small ovoid, glabrous, or hispid at base. Styles glabrous. Fruit small, rounded.

Of the above only *R. Lemaitrei* has been recorded from Britain, while *R. condensata* and *R. purpurascens* come from the Savoy; but the other two may be, and probably are, found in Britain.

Rosa Lemaitrei

Ripart ex Déséglise, Catalogue Raisonné, p. 182 (1877).

"Near *R. andegavensis*, from which it differs in its glabrous styles and smaller biserrate leaflets."

I quote the above because it was communicated to Déséglise by Ripart, but an earlier publication appeared in the key in Crépin's *Primitiæ Monographiæ* (1869). Here Crépin associates it with two or three other species in a group in which the leaflets of the lowest leaves of the flowering-branches have one or two accessory teeth, the rest being simple. His key characters are: "Sepals more or less glandular. Calyx-tube hispid at the base. Styles glabrous. Leaflets small, midrib rather hairy when young. Flowering-branches short, internodes close. Stipules all dilated." The only British species which he contrasts with it is *R. Suberti* Rip. as follows:—"Styles glabrous or nearly so. Leaflets medium or rather large, glabrous on midrib. Flowering-branches elongate, internodes distant. Only upper stipules dilated."

There are ten sheets in herb. Déséglise, one of them being of Ripart's own gathering. The leaflets, which never seem to be much biserrate, are remarkably uniformly serrate in Ripart's specimen. Its styles are not glabrous, but decidedly though thinly hairy. The petioles have a little long hair, which does not appear in most specimens; but I have seen none with even a trace of hair on the midribs, as Crépin says is to be found in young leaflets. Ripart's specimen is a little smaller in all its parts than normal *andegavensis*, but this is not the case with other specimens.

There are two British examples. One from Mr. Baker, with no name or date, has quite compound serrate leaflets of moderate size, and shaped like those of *R. andegavensis*. The other specimen, from St. John's, Trelay, E. Cornwall, collected by Briggs, and labelled by him "*R. verticillacantha?*" has large suborbicular leaflets like those of *R. platyphylla*, but quite glabrous, and with compound serration. The peduncles are in small clusters, and are slightly glandular; sepals glabrous on back; styles glabrous.

Rosa Suberti

Ripart ex Déséglise, Catalogue Raisonné, p. 183 (1877).

"Habit of *R. andegavensis*. Prickles on branches dilated, compressed at base, hooked or inclined at summit. Petioles glabrous, with scattered glands, some unarmed, some prickly. Leaflets 5–7, oval-acute or obtuse, glabrous, green above, glaucescent beneath, the midrib often with small acicles, biserrate. Stipules narrow, glabrous, gland-ciliate, auricles acute, straight or diverging; some stipules are glandular on the back. Peduncles solitary or 2–3, feebly hispid, with oval cuspidate bracts, glabrous, glandular-ciliate, longer than or equalling peduncles. Calyx-tube ovoid elongate, a little contracted at the top, glabrous. Sepals with thinly scattered glands on back, two entire with tomentose edges, three pinnatifid with glandular-ciliate appendages, salient in bud, shorter than corolla, not persistent. Styles hispid. Disc almost flat. Flowers light rose. Fruit ovoid or obovoid, red."

There is considerable disagreement in the characters assigned by various authors to this species which I do not think it would be profitable to transcribe, because Déséglise's description, which I have given above, is said by him to be drawn up from Ripart's own notes and specimens; also I have seen four of Ripart's own specimens.

Ripart, in his key, associates *R. Suberti* with *R. Lemaitrei* and other non-British species in a group having biserrate leaflets and subglabrous or thinly hairy styles, but does not discriminate between the individuals of the group. There are three of his specimens in herb. Déséglise. They have medium-sized, fully biserrate leaflets, which are somewhat elliptical and often slightly narrowed below. The petioles are very glandular, and the midribs decidedly so. The stipules are very glandular on their edges and midribs, but not on the surface. The peduncles vary in length, and are quite hispid-glandular, but not the calyx-tube. The sepals are strongly glandular-ciliate, but not obviously glandular on the backs. Very little fruit is formed, but what there is is ovoid, not at all elongate. The styles are quite thinly hispid. A specimen by the author at Kew has large ovate acuminate leaflets, hardly more than irregularly serrate, very slightly glandular on midrib. Petioles a good deal glandular, but glabrous. Peduncles longish, somewhat hispid-glandular. Sepals slightly glandular on back. Fruit ellipsoid. Styles glabrous.

A specimen collected by Briggs at Woodlands, Devon, and labelled by him "*R. verticillacantha*," has long leaflets with remarkably open biserrate teeth, the petioles finely pubescent or glabrous, and not much glandular. Peduncles very little glandular.

This species seems to be too closely allied to *R. Lemaitrei* Rip. The only tangible difference which I can see is that it has its leaflets more decidedly biserrate.

Rosa surculosa

Woods, Synopsis of the British Species of Rosa, in Trans. Linn. Soc. xii. p. 228 (1817).

"Shrub 8 feet high. Branches dark purple or intensely fuscous, the young ones glaucescent, sometimes very prickly, or sometimes almost unarmed. Prickles very strong, hooked, in pairs under the stipules or solitary, scattered. Petioles only scattered hairy above, in other respects glabrous, furnished with strong hooked prickles. Stipules spathulate or linear, sometimes serrate, sometimes glandular-ciliate at the base, sometimes quite entire except at the apex, glabrous, sometimes pilose on the edges, the floral ones broader, becoming, by the loss of their leaves, elliptical acuminate bracts. Leaflets 5–7, the upper pair and terminal one larger than the others, the edges and midrib above only with scanty hairs, elliptical or subrotund, acuminate, the terminal cordate or ovate, serrate, glabrous beneath, dull, the young purplish. Peduncles 1–24, here and there with scattered, very slender setæ or hairs. Receptacle ovoid, fuscous, glabrous, disc convex. Sepals triangular-elliptical, divided almost to the base, pinnæ lanceolate or linear-lanceolate, nerved, quite entire. Flowers red. Styles porrect, villous, stigmas in a dense head. Fruit broadly ellipsoid, red."

In the notes which follow the above description, Woods points out that it differs from *R. canina* in its flat, not carinate, leaflets, strongly prickly petioles, peduncles almost always hairy or setose, entire sepal pinnæ, and porrect styles; also by its strong barren shoots covered with "blue wax," and its cymes of eight to twenty flowers.

Woods's No. 119, collected by Borrer at Partridge Green, Sussex, is only the end of a flowering-branch, unarmed except for rare small hooked prickles on some of the petioles, which are quite hairy above, but quite eglandular. The leaflets are medium-sized, oval, acute, not acuminate, rather coarsely but simply acutely toothed. Peduncles solitary, one covered by its bracts, the other glandular-hispid. Sepals eglandular on edges, little divided. Styles longish, subglabrous. Fruit ovoid, but not fully formed.

No. 120, from same station and collector, is much more luxuriant. Prickles few, but stout and hooked. Petioles quite pubescent above, quite eglandular, with 2–3 small hooked prickles or none. Leaflets large, broadly oval, cuspidate, quite broadly rounded at base, toothed like the last. Cymes large, one from each of the last three axils, the two lower with seven flowers each, the terminal with fourteen, but all combined into one large cyme. Some peduncles thinly glandular, some slightly hairy, some glabrous and smooth. Flowers scarcely opened; styles, where they can be seen at all, appear subglabrous. Sepals pinnate, not gland-ciliate.

No. 118, from Hayes, Middlesex, is a stout barren shoot, from

the same bush as No. 117, which unfortunately is missing. No. 118 has few stout prickles, not much hooked. Petioles glabrous and eglandular, with small, much hooked prickles. Leaflets rather large, broadly oval or suborbicular, much the same shape as those of No. 120, but with remarkably coarse spreading teeth.

Other examples in the British Herbarium have rather broad but not large leaflets, the apex varying from quite rounded to longly acuminate. The teeth are deep, sharp, close, and forward pointing, almost regular; petioles often quite hairy. The sepals are rather narrow and long, quite remarkably so in one of Forster's specimens. The peduncles are usually numerous, and though glandular setæ can be found on some in each cluster, they are quite frequently glabrous, or very slightly hairy. The fruit in many of the specimens is not formed, but the calyx-tube usually looks as if it would develop into a fruit rather long than broad. Some, however, have subglobose fruit. The styles are usually very thinly hispid and more often nearly glabrous than villous, but I do not think Woods used the latter word to mean "densely hairy," as modern authors have done.

This species has hitherto been regarded by British botanists as a variety of *R. lutetiana*, but if a subgroup having hispid peduncles is recognized, it seems better to place it therein, as Déséglise has done. Both specimens and Woods's notes point to the almost invariable presence of a few glandular setæ.

Déséglise has found a plant in France which he considers very near *R. surculosa*, but with glabrous styles and white flowers. He named it *R. edita* Déségl.

Rosa verticillacantha

Mérat, Flore de Paris, p. 190 (1812).

"3–5 feet, with small curved prickles, 4 or 5 together, almost semi-verticillate. Leaflets oval, with eglandular teeth, glabrous. Petioles glabrous, very lightly glandular. Peduncles and fruit hispid, with glandular hairs. Sepals nearly simple, very glandular. Flowers solitary, pale rose. Fruit globular."

Baker, in "Review of British Roses," p. 31:—"Habit and prickles of normal [*lutetiana*]. Leaves firm, bright green above, paler beneath, glabrous both sides; serration sharp but moderately open, each tooth with 1 or 2 gland-tipped teeth. Terminal ovate, a little rounded at base. Petioles densely setose, but only slightly hairy, and furnished with 2–3 hooked prickles. Stipules and bracts naked on back, but closely setoso-ciliate. Peduncles densely aciculate and setose, usually shorter than the bracts. Fruit elliptical, naked, not ripe till October. Sepals somewhat glandular on back, and densely setoso-ciliate, deciduous by the time the fruit changes colour. Styles slightly hairy." He adds: "Specimens agree with the description of *R. verticillacantha* Mér., but in the latter the prickles are said to be arranged 'en spire autour de la tige.'" I do not know where Mr. Baker is quoting from; Mérat's

own words are: "4–5 ensemble, presque semi-verticillés." Surely a verticil and a spiral are not the same thing?

Déséglise thinks the above description probably refers to his *R. inconspicua*, and Mr. Baker queries the name *verticillacantha*, though he uses it in the Monograph without comment.

Déséglise says he has searched vainly for a type of Mérat's, and in consequence of his failure to find one he seems to throw a doubt on the occurrence of this species in Britain, and does not quote any of the stations from which he has foreign specimens in his own herbarium, though many of the examples therein are named without any expression of doubt. His opinion is that *R. inconspicua* Déségl. is the *R. verticillacantha* of most authors, but I am unable to discover any valid reasons for this supposition; the mere failure to find a type appears to be an argument which is applicable to several of the older species. Crépin, in his "Revision des Roses de l'herb. Babington" (Journ. Bot. 1896), throws no light on the question, but omits both species from his key in Prim. Monog. Rouy only mentions *R. inconspicua*, so that these authors show by inference that they do not understand *R. verticillacantha* Mér., though there can be no doubt as to its being a native of France, as Mérat described it from a specimen from Calvaire.

The differences between *R. verticillacantha* Mér. and *R. inconspicua* Déségl. are set forth on a sheet of the latter in the author's herbarium, thus:—"Differs from *verticillacantha* in having fewer prickles, not arranged in a spiral [this contradicts his own description of *inconspicua*, which says, 'prickles in a spiral, forming almost a whorl']. Petioles not villous. Leaflets with glandular midrib. Stipules with straight auricles. Peduncles less hispid. Calyx-tube ovoid, glabrous. Flowers light rose." He attributes "pale rose" flowers to *R. verticillacantha*. It will be seen that, with the exception of the prickles, the differences are of a trivial nature, and, apart from Déséglise's contradictory statements about them, I find that in specimens of both the prickles are usually scattered, as in most species of the section, and, though examples may be found showing them in clusters of two to four, they occur just as frequently in one species as in the other, or, if anything, they are more frequently whorled in *R. inconspicua* than in *R. verticillacantha*.

Specimens in Déséglise's herbarium named *R. verticillacantha* Mér. without any indication of doubt have the leaflets often quite glandular-serrate, though Mérat expressly says they are eglandular. They are usually rather small, and only one example has glandular midribs. The petioles are glabrous and a good deal glandular, and differ in no respect from those of *inconspicua*. The sepals vary considerably in cutting and in glands. The styles are more villous than in *inconspicua*, and the fruit usually ellipsoidal.

There are no British examples in herb. Déséglise, but until the ambiguity between this species and the next can be cleared up I am retaining it in our list. I think, however, they will prove to be synonymous.

Rosa inconspicua

Déséglise in Catalogue Raisonné, p. 188 (1877).

"Shrub with numerous prickles, dilated at the base, recurved at tips or almost straight, in a spiral forming almost a whorl round the stem. Petioles with scattered hairs at the insertion of the leaflets, glandular, prickly. Leaflets 5–7, oval-acute, oval-elliptic, some subobtuse, of medium size, glabrous, green above, glaucous or glaucescent beneath, the midrib with some small glands, doubly dentate, the secondary teeth glandular. Stipules glabrous, gland-ciliate. Auricles acute, straight or slightly diverging. Peduncles solitary or in small clusters, hispid glandular. Bracts oval cuspidate, one often trifoliate, glabrous, gland-ciliate, longer than or equalling peduncles. Calyx-tube ovoid, glabrous or hispid. Sepals glabrous on the back, two entire with tomentose edges, three pinnatifid with glandular-ciliate appendages, salient in bud, shorter than the corolla, not persistent. Styles hispid. Disc more or less elevated. Flowers rather large, rose. Fruit ovoid."

On one of the specimens in his herbarium Déséglise writes out almost word for word the same description as the above, with the important omission of any reference to a spiral or whorled arrangement of the prickles, which he describes as hooked. He also says the calyx-tube is glabrous, and adds: "Differs from *andegavensis* in leaflets having the midrib glandular, biserrate. Stipules glabrous. Peduncles with a few scattered glandular setæ. Calyx-tube glabrous." Its differences from *verticillacantha* have been detailed under that species.

Specimens named by Déséglise commonly have their prickles in pairs or in whorls of 3–4. The leaflets are rather close set, almost elliptical, frequently subobtuse, instead of the widely-spaced, rather large leaflets, considerably narrowed at each end, of *R. andegavensis*. The toothing is quite double and glandular. The petioles are considerably glandular, and the glands usually extend to the midrib, but never to the side nerves. The fruit is ovoid, usually shorter than in *verticillacantha*, whereas by description the reverse should be the case. The sepals are rather loosely reflexed or spreading, and the styles often subglabrous.

There are five British examples in herb. Déséglise. One collected by Mr. Baker at Myson, Warwick, and unnamed by him, has almost lanceolate leaflets, very glandular biserrate. Its fruit is ovoid, sepals glandular-ciliate, and styles thinly hispid. A specimen by Messrs. Groves from Barnes, labelled *R. inconspicua*, has narrow-elliptic, glandular-biserrate leaflets, with glandular petioles, ovoid fruit on short hispid peduncles and hispid styles. Another specimen from the same locality has smaller leaflets, small fruit, and densely hispid styles. Webb's Hoylake plant, labelled "*R. verticillacantha* towards *marginata*," has prickles in threes to fours, elliptical leaflets, petioles quite pubescent and

glandular, but midribs glabrous and smooth. Peduncles moderately and sepals very glandular. Fruit ovoid-subglobose. Styles densely hispid. Another example from the same station is very similar, but has glabrous petioles. All these five have strongly glandular biserrate leaflets.

Rosa latebrosa

Déséglise, "Notes extr. de l'énumeration des Rosiers," in Journ. Bot. 1874, p. 170.

"Habit of *R. andegavensis*. Prickles robust, dilated, compressed at base, inclined or slightly hooked at the tip, *running into fine setaceous acicles on the flowering-branches*. Bark vinous or greenish. Petioles glabrous, with fine glands, prickly. Leaflets dark green above, oval, those on young shoots oval-lanceolate or oval-elliptical, biserrate, the larger teeth open, mucronate, the secondary glandular. Midrib with some glands. Stipules glabrous, with acute, straight auricles, interstipular part glandular. Peduncles solitary or 2–4, *some hispid, others glabrous*. Bracts oval cuspidate, glabrous above, *glandular beneath*, longer than peduncles. Calyx-segments oval, spathulate at top, two entire with edges tomentose only beneath, three pinnatifid, *glandular on the back*, appendages a little serrate and gland-ciliate, reflexed, deciduous. Styles hispid. Disc a little conical. Fruit ovoid, glabrous."

This is the only British species of the subsection which has aciculi on the stem. There is one closely allied foreign plant, also having glabrous leaflets, viz. *R. interveniens* Déségl. Both seem to be quite rare on the Continent. *R. latebrosa* does not appear to be mentioned by any author but Déséglise, and Rouy is the only other writer who mentions *R. interveniens*, which he regards as a *gallica* × *canina*. Crépin has a species, *R. occulta*, which Déséglise regards as synonymous with one or other of his own species, but is uncertain which. Plants with similar characteristics, but with hairy leaves, are found on the Continent, some authors regarding them as varieties of *R. dumetorum*, and others as *gallica* hybrids. I am inclined to the latter theory, and would include *R. latebrosa* in this class. *R. gallica* is not a native of Britain, but is sufficiently frequently cultivated to produce natural hybrids.

I have seen no foreign specimens of *R. latebrosa*, but Déséglise has several gathered by Briggs in Devon and Cornwall. There is also a specimen from Monmouth by Mr. Ley. They all have strong hooked prickles, those on the flowering-stems being mixed with fine small acicles, but not showing a gradual transition thereto. In some specimens the aciculi are only to be found on the very tops of the flowering-branches. The leaflets are usually rather small, fully biserrate. The bracts and sepals are glandular on the back, and the fruit ovoid.

ROSA ASPERNATA

Déséglise, "Notes extr. de l'énumeration des Rosiers," in. Journ. Bot. 1874, p. 171.

"A low shrub, the bark of the branches brownish or greenish. Prickles dilated at the base, straight, robust, scattered, and few. Petioles glabrous, with fine scattered glands, prickly or not. Leaflets 5–7, oval or oval-elliptical (those of young shoots often ending in a point), green above, paler and glabrous below, secondary nerves rather prominent, glandular-biserrate. Stipules rather large, glabrous, gland-ciliate. Auricles acute, erect or divergent. Peduncles solitary or grouped in threes, covered with little spiny setæ ending in a gland. Bracts broad, oval-cuspidate, glabrous, longer than or equalling the peduncles. Calyx-tube violet, subglobose, covered with spinous setæ. Sepals spathulate at the tip, glandular on the back, two entire, three pinnatifid, salient in bud, shorter than the corolla, reflexed, deciduous. Styles short, hispid. Flowers rose. Fruit red, ovoid."

There is a tendency on the part of British botanists to place any rose of this group which has glandular-hispid fruit to this species. This is incorrect. Both *R. andegavensis* Bast. and *R. inconspicua* Déségl., as well as other species, may have glandular-hispid fruit, while *R. aspernata* Déségl. may, though rarely, have it naked. The essential feature of the species is the stoutness and abundance of the setæ, which are almost like acicles, on the peduncles. Some of the setæ are often eglandular, and, as already mentioned, although usually abundant on the fruit, may rarely only reach its base, or be absent therefrom altogether.

It appears to be a rare species on the Continent, Déséglise having only three French specimens. They all have small, rather narrow-elliptical leaflets, and in one of them the serration is almost simple, and not at all glandular.

There are two specimens from Briggs. One from Warleigh, Devon, labelled "*R. verticillacantha* var.," has very strongly setose fruit, many of the setæ being eglandular. The leaflets are rather large or medium, rounded at the base, with short point, glandular-biserrate. The petioles are somewhat glandular, but not hairy, and stipules not much gland-ciliate. Fruit ovoid. Styles thinly hispid or subglabrous. Sepals very glandular on the back. His example from Woodlands, Devon, labelled "*R. saxatilis* Bor.' (which is a synonym of *R. aspernata* Déségl.), is generally similar, but has shorter, much more suborbicular leaflets, and more decidedly hispid styles.

Déséglise regards *R. aspratilis* Crép. as probably a synonym. Its author gives it glabrous styles.

FOREIGN SPECIES OF SUBGROUP III.

The foreign species of this group which should be looked for in Britain are as follows. Specimens often differ so widely from descriptions of what would appear to be leading characters that

I have had to class some species in more than one place. The short notes are given in that part of the key where the plant should fall by its author's description :—

Leaflets simply serrate :—
Styles glabrous or nearly so :—
R. edita Déségl. Flowers white, in large clusters. Fruit small, subglobose, smooth.
R. agraria Rip. Flowers rose. Fruit ovoid, smooth or glandular at base only. Prickles straight, stout.
R. Rousselii Rip. Flowers light rose. Fruit ovoid-subglobose, hispid-glandular. Leaflets broad, subobtuse.
R. hirsuta Déségl. & Ozan. See below.
Styles hispid :—
R. vinealis Rip. Leaflets rather large, oval. Petioles glandular and prickly. Fruit large, ellipsoid, glabrous. Flowers large, fine rose. (Very near *R. andegavensis*, but with fewer and finer setæ on peduncles.)
R. Rousselii Rip. See above.
R. transmota Crép. Leaflets large, suborbicular. Petioles scarcely glandular, quite unarmed. Flowers large, bright rose. (Regarded as a *gallica* × *canina* by some authors.)
Styles densely hispid or woolly :—
R. purpurascens Rip. Stipules and bracts broad, very red. Prickles straightish. Fruit ovoid. (Closely allied to *R. glauca* Vill.)
R. condensata Pug. Short, compact, not red. Prickles hooked. Fruit subglobose.
Leaflets irregularly serrate :—
Styles glabrous or nearly so :—
R. obtusa Rip. See below.
R. hirsuta Déségl. & Ozan. Petioles very hairy. Prickles straight. Fruit hispid.
R. interveniens Déségl. Flowering-stem bearing acicles, at least at top.
Styles hispid :—
R. vinealis Rip. See above.
Styles villous :—
R. Kosinsciana Bess. Leaflets large and broad. Petioles somewhat hairy. Peduncles usually numerous. (Regarded as a *gallica* × *canina* by some authors. This is not the same as the plant with hairy leaflets which has been called by this name in Britain.)
Leaflets fully biserrate :—
Styles glabrous :—
R. obtusa Rip. Very near *R. Lemaitrei* Rip. (*i. e.* a glabrous-styled variety of *R. andegavensis*), but leaflets shorter and broader. Fruit small, subglobose.
Styles hispid or densely so :—
R. psilophylla Rau. Leaflets large and broad. Petioles somewhat hairy. Flowers large, in small clusters.

Subgroup iv. Leaflets biserrate, glandular on midrib and also on secondary nerves. Peduncles glandular-hispid or not.

Key to British Species.

1 { Peduncles glabrous 2
  { Peduncles glandular-hispid ..... *R. trachyphylla* Gren.

2 { Leaflets oval, subobtuse, or cuspidate. Fruit subglobose ..... *R. scabrata* Crép.
  { Leaflets elliptical, acuminate. Fruit ovoid ..... *R. vinacea* Baker.

Rosa scabrata Crépin.

Crépin did not publish any separate description of this species, but in his *Tableau Analytique* (1892) he makes it the type of a group of varieties of *R. canina* which have glabrous biserrate leaflets, with the secondary nerves more or less glandular, and smooth peduncles. It is very questionable, therefore, whether he is entitled to the name. He also mentions it by name (only) in his Prim. Monog. (1869) in a subsection of his section *Caninæ*, but without discrimination from other species.

Christ, in *Rosen der Schweiz*, p. 130 (1873), places Crépin's plant as a variety of *R. tomentella*, remarking that it "reminds one of *canina* by its complete glabrousness or only somewhat pubescent petioles and its very scattered prickles, but of *tomentella* by its leaflets being more or less densely glandular beneath, with its peculiar short secondary toothing and broader prickles."

Neither Déséglise, Dumortier, nor Rouy and Foucaud mention this species at all, but Keller in Ascherson & Graebner's Fl. Mitteleurop. (1901) give it a considerable description, emphasizing the "dark red" glands on the petioles, nerves of the auricles, and midribs and secondary nerves of the leaflets, sometimes extending to the nervelets. He describes the leaflets as oval, medium-sized, shortly cuspidate, much cuneate at base.

There is a specimen at Kew collected and named by Crépin. It has stem-prickles moderate or rather stout, hooked, those on the flowering-branches being quite small. The leaflets are rather broadly oval and obtuse, fully biserrate, considerably glandular on the midrib, and slightly so on the side nerves and nervelets, but the glands are not "dark red" as described by Keller. Petioles densely glandular, rather densely pubescent in the lower part, but less so above, prickly. Stipules glabrous. Peduncles 1–3, short, smooth. Sepals gland-ciliate, not or scarcely glandular on the back. Fruit small or medium, urceolate-subglobose. Styles hispid.

There is a poor specimen in herb. Déséglise without name, on which Crépin has written "*Scabratæ*," and someone else has added "*scabrata*," but it is not clear that Crépin meant to refer it to his segregate. It has rather numerous, rather slender prickles, which are curved but not hooked, quite small elliptical leaflets, not strongly biserrate, with shallow fine teeth, a few obscure glands

on the midrib, and fewer still or none on the secondary nerves. Petioles glabrous, but rather densely glandular. Peduncles very short, smooth. Fruit small or medium, ovoid or subglobose. Styles hispid.

I have not seen any British examples of *R. scabrata*, though Crépin frequently applied the name in an aggregate sense to plants which were sent him. I retain it in the list as I can see no special reason for rejecting it, but I do not feel sure of its specific characters. It is obviously rather near some of the forms of *R. vinacea* Baker, but has broader, more obtuse leaflets and more subglobose fruit.

Rosa vinacea

Baker, Review of British Roses, p. 32 (1864).

"Habit, growth, and prickles of normal. Leaves somewhat glaucous, green, firm, hardly flat, quite glabrous above, paler but not at all hairy beneath, the veins prominent, glandular on midrib and principal veins. Teeth sharp but moderately open, each furnished with 1–2 fine gland-tipped serrations. Terminal narrow ovate, hardly rounded at base, the petiole not hairy, but prickly and densely setose. Stipules and bracts naked or slightly glandular, densely setoso-ciliate. Peduncles and calyx-tube naked, the latter subglobose. Sepals reflexed after fall of petals, leaf pointed but not much pinnate, slightly glandular on the back, and copiously setoso-ciliate. Fruit subglobose, not ripe till October, by which time the sepals have fallen. Styles hairy. Veins of leaves, petioles, stipules, and bracts all deeply tinged red."

The above description was written by Mr. Baker under his subsection *Subrubiginosæ* of *R. canina*, in which the midribs and side nerves of the leaflets are glandular. This clearly indicates Crépin's group, which is typified by his *R. scabrata*, to which group indeed he refers Mr. Baker's No. 28 (see Journ. Bot. 1894, p. 181). But in his Monograph, for no stated reason, Mr. Baker reduces *R. vinacea* to a synonym of *R. biserrata* Mér., which is not quite intelligible, though no doubt the two have been confounded by British botanists who have not understood the latter plant. At the same time he alters the shape of his fruit from subglobose, which would be correct for *biserrata*, to oblong, which, judging from specimens, is more correct for *vinacea* than his original description of subglobose. This alteration of views may account for the confused ideas of *R. vinacea* prevalent among British botanists.

Mr. Baker's type appears to have been his No. 28 from Thirsk. This has small curved prickles. Petioles glabrous and thinly glandular. Leaflets rather large, well spaced on petioles, narrowly elliptical or somewhat lanceolate, longly acuminate at the apex, and often much narrowed at base, never quite rounded, the toothing a good deal biserrate, but secondary teeth little gland-tipped. There are only a few inconspicuous glands on midribs, and none on side nerves, which is not in keeping with the group characters, but the glandular development frequently varies, and may be

exceptionally absent from this specimen, because Mr. Baker clearly says, "glandular on midrib and principal veins"; moreover, a specimen bearing the same number at Kew has some of its leaflets with glands on the secondary nerves, but only a few are reversed so as to show the backs. The peduncles are solitary and rather short. Fruit medium or small, ovoid or oblong, not at all subglobose, though rounded below. Styles hispid. The stipules, &c., do not appear at all red, though this colour is usually well retained in dried specimens if present when fresh.

Another specimen by Mr. Baker from Sowerby hardly differs except in its stronger prickles, and still less glandular midribs. Young fruit ellipsoid, narrowed below.

There are also the following four examples, which are considerably off type; in fact, I doubt whether the first two are *R. vinacea* or even belong to this group.

A plant from Thirsk by Mr. Baker has remarkably unequal stem-prickles. The leaflets are broader, almost simply serrate and quite eglandular beneath. The petioles are very nearly eglandular. Fruit much as in his Sowerby specimen. A specimen from Botus Fleming, East Cornwall, by Briggs, differs at first sight by its broader, closer-set leaflets, which are much biserrate, but with the teeth very little glandular and midribs quite eglandular. The stipules are reddish. Peduncles solitary, shorter than bracts; fruit ovoid; sepals long, not much gland-ciliate; styles hispid. His Tamerton Foliot plant comes between the last and Mr. Baker's No. 28 in the shape, &c., of its leaflets, which have slightly glandular midribs. The petioles and leaf-toothing are very glandular. Fruit a little broader but still ovoid. Mr. Rogers's specimen from Luccombe Chine is very like the last in leaflets, but the toothing is hardly at all glandular, and the petioles are eglandular. The flowers are in bud.

It appears that we must fall back upon Mr. Baker's description in the Review and his No. 28 in order to understand this species. Its principal features seem to be rather large but narrow leaflets, well spaced on the petioles, and fully biserrate. At least some of the secondary nerves should be glandular. Plants which are glandular on the midrib only not unfrequently occur in other groups. Ovoid or even oblong fruit and hispid styles seem also to be tolerably constant characters.

Rosa trachyphylla

Grenier (non Rau), Flore de la Chaine Jurassique, p. 243 (1865).

"Bush 7 feet high. Prickles short, hooked, dilated at base. Petioles *glabrous* or puberulent, with stipitate glands, more or less prickly. Leaflets 5–7, all petioluled, *oval-elliptical-cuspidate*, glabrous above, scarcely paler beneath, with salient whitish nerves, *bearing scattered salient glands*, doubly glandular dentate. Stipules narrow, glabrous, a little glandular, with acute diverging auricles. Peduncles one or in a cluster, *hispid-glandular*, very rarely naked, with large glabrous glandular-ciliate bracts. Calyx-tube

ovoid, glabrous or hispid at the base. Sepals pinnatifid, reflexed, deciduous. Flowers pale rose. Styles very villous. Fruit subglobose.

"*β nuda* (*R. Blondæana* Déségl.). Petioles not puberulent. Only midribs salient. Peduncles little or not glandular. Grows on same bush as type!"

The above name and description must, I think, stand for what we have called *R. Blondæana* Rip. and *R. canina* var. *marginata* Baker. The proper treatment of these plants has given me more trouble than any I have yet dealt with, and I fear I have not satisfactorily solved the problem. Déséglise has conclusively proved that we have not got *R. marginata* Wallr., that being a species with its prickles degenerating into acicles, and its leaflets almost eglandular beneath, except a very few on the base of the midrib. Crépin, no doubt correctly, refers it to *R. gallica* × *canina*.

But what are *R. Blondæana* Rip. and *R. marginata* auct. plur non Wallr.? I quote Déséglise's description of *R. Blondæana* Rip., with some notes on specimens named by Ripart, after the present species, and endeavour to show there that British specimens referred to that species by Déséglise are really *R. arvatica* Baker. There may be authentic* British examples of *R. Blondæana* Rip. in private herbaria, but I venture to suggest, judging from Ripart's description and specimen, they are not sufficiently distinct from plants which have been placed by Déséglise to *R. marginata* auct., and this view is substantiated by Déséglise himself in his referring *R. marginata* auct. to *R. trachyphylla* Grenier, if he also accepts the latter author's treatment of *R. Blondæana*. I must admit, however, that Déséglise is silent on this point. Specimens labelled *R. marginata* "Wallr." differ from Ripart's species mainly in their prickles being more slender and straighter, their leaflets larger, glaucous instead of shining, peduncles, fruit, and sepals more glandular-hispid, sepals more erect and more persistent, sometimes remaining erect till fruit changes colour, fruit more globose, styles more woolly. The only important difference from Grenier's description of *R. trachyphylla* is the erect sepals, which character, combined with the woolly styles, shows a connection with *R. glauca*. The above differences will be seen to be those of degree, not of kind.

Déséglise, while admitting that British specimens of *R. marginata* come nearer to Wallroth's type than do those of France and Belgium, has not labelled them with that name, but refers them to *R. marginata* auct., which he says is exactly *R. trachyphylla* Grenier, of which he had seen several specimens named by Grenier.

I have seen one sheet of *R. trachyphylla* Gren. collected by the author in France. It consists of five flowering-shoots de-

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* By "authentic" I mean, here and elsewhere, material named or accepted by some well recognized authority.

tached from their stems, but one has one stem-prickle attached to it, which is rather stout, straightish, with curved tip. Those on the flowering-shoots are small, slender, and straight. The petioles are considerably glandular, and have a good many short aciculate prickles, but are very nearly, and some of them quite, glabrous. The leaflets are rather small, oval-acute, not or scarcely acuminate, strongly glandular-biserrate, and decidedly subscabrously glandular on midrib and side nerves, occasionally on minor nerves also. The peduncles are quite short, mostly hispid-glandular, but one or two almost smooth. Fruit broadly ovoid, rather large. Sepals quite glandular on the back, with short pinnæ, strongly gland-ciliate, spreading. Styles in a dense, rather broad woolly head, like those of *R. glauca*, to which this plant is obviously allied.

A specimen collected by Mr. Baker at Kilvington, N. Yorks, was endorsed by Déséglise "*R. Blondæana* Baker an Rip.? *R. marginata* auct. non Wallr." It has curved prickles, large elliptical glandular-biserrate leaflets, with very fine glands on midrib, but Mr. Baker says they also occur on the side nerves*; glandular petioles; sepals erect, persistent, very glandular on the back; fruit subglobose; styles woolly.

A specimen from Glen Shee has remarkably long, straight, slender prickles; petioles glabrous and glandular; leaflets large, elliptical, dark green, biserrate, but teeth not very glandular; midrib glandular* and prickly; peduncles and calyx-tube hispid-glandular; sepals very glandular on back, with very long, foliaceous points; flowers large, bright pink. Too young to see fruit.

For the present it seems desirable to refer all British plants of this group having glabrous, biserrate leaflets glandular on secondary nerves, and with hispid peduncles, to *R. trachyphylla* Gren. Of course, if a similar standard be adopted to that in other groups for the segregation of other species or varieties with those leading characters, no doubt a similar course is open here, but under what name I cannot at present suggest.

Rosa Blondæana

Ripart ex Déséglise, Essai Monographique, p. 133 (1861).

"Tall, branched. Stem-prickles robust, dilated at the base, hooked, those of the branches weaker, curved. Petioles *furrowed*, with fine stipitate glands, *almost* unarmed or with very weak prickles. Leaflets all petioluled, terminal rounded or narrowed below, *oval-cuspidate* or *oval-obtuse*, firm, glabrous, *deep green*, *shining* above, *opaque* below, nerved, but only midrib salient, brownish glandular, the secondary with scattered but deciduous glands, biserrate with glandular denticles. Stipules *broad*, glabrous above, scattered glandular beneath, gland-ciliate. Auricles

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* According to some authors the glands in this and in some other species are more or less deciduous, which no doubt accounts for their absence from the side nerves in some specimens.

acuminate, erect. Peduncles 2–7, with some stalked glands, but weak and few. Bracts broad, oval-cuspidate, glabrous, gland-ciliate, usually longer than the peduncles, and often also a small one shorter than the peduncles. Calyx-tube ovoid, hispid at the base. Sepals ovate-lanceolate, glandular, pinnate with linear appendages, gland-ciliate, reflexed, then erect, but not persistent. Styles *hispid*; disc conical. Flowers large, pale rose. Fruit large, ovoid, rounded. Differs from *trachyphylla* Rau in petioles being only glandular, not pubescent as well. Leaflets dark green, shining above, opaque below, nerved, only midrib salient, brownish glandular. Stipules broad. Auricles acuminate, erect. Peduncles less glandular. Styles hispid, not villous."

Mr. Baker, in Review, p. 34, has:—"Stem dark purple, glaucous when exposed. Branches more divaricate than usual, prickles less robust and less curved. Leaves somewhat glaucous green above, decidedly glaucous beneath, glabrous both sides, but glandular on midrib and slightly so on surface beneath. Serrations moderately sharp and open, each with 2–3 fine gland-tipped teeth. Terminal typically ovate or rather obovate. Petioles prickly and densely setose, but not hairy. Stipules and bracts not hairy but a little glandular on backs, and copiously setoso-ciliate. Peduncles slightly aciculate and setose. Calyx-tube naked, subglobose. Sepals leaf-pointed and copiously pinnate, glandular all over the back, erect after the petals fall. Fruit obovate or subglobose, scarlet early in September, by which time some of the sepals have fallen, others remaining. Styles rather thickly hairy."

In the Monograph Mr. Baker calls this *R. marginata* Wallr., giving much the same description, but describes the leaves as oblong, with the veins unusually prominent beneath; the sepals ascending after the petals fall, becoming disarticulated by the time the fruit has turned red; styles moderately hairy. He quotes as a synonym *R. trachyphylla* var. *nuda* Gren.

I have seen two foreign specimens of *R. Blondæana* named by Ripart. One, in herb. Déséglise, has quite ordinary prickles, *i. e.* not robust and hooked as described. The petioles are glabrous, but densely glandular. The leaflets are small, not broad, often obtuse, fully glandular-biserrate, the midrib prominent below with small inconspicuous glands which extend to the side nerves, also with micro-glands all over the lower surface. Peduncles short, thinly hispid-glandular. Fruit ovoid, large. Styles fully hispid. This specimen, it will be seen, agrees very closely with the description.

The other specimen of Ripart's was kindly lent me by Messrs. Groves. It has almost unarmed flowering-branches. Petioles glabrous, moderately or thinly glandular. The leaflets are rather broadly oval-cuspidate, some fully, some scarcely biserrate, very inconspicuously glandular beneath—in fact, some leaflets are almost eglandular. The stipules are broad with large auricles like those of *R. glauca*, some glandular, others glabrous. The peduncles are in clusters of 3, they appear glabrous, but are too

much hidden by their bracts to say definitely. The styles are thinly hispid.

There are two British plants in this cover in herb. Déséglise. One is from West Kirby, Cheshire, by Webb, labelled by Mr. Baker "*R. arvatica*, excellent." It has large hooked prickles. The petioles are pubescent as well as glandular. Leaflets rather large, very strongly biserrate, inconspicuously glandular on the midrib. Peduncles glabrous, fruit globose, sepals spreading, strongly glandular. Styles hispid. Except for its glabrous midribs, this is really much nearer *arvatica* than *Blondæana*, to which it has quite a different aspect beyond the technical characters.

The other is also from Webb, collected at Hoylake, which is quite near West Kirby. It is a very similar-looking plant, but having hairy midribs is, I think, indisputably *R. arvatica* Baker; moreover, it is significant that, though this is in Déséglise's cover of *R. Blondæana* Rip., he has not written that name upon it, in accordance with his almost universal practice, nor does he mention it in his Catalogue Raisonné, though he quotes the West Kirby specimen.

As mentioned under *R. trachyphylla* Gren., I have not been able to satisfy myself that *R. Blondæana* Rip. exists in Britain, or even that it is distinct from the former; but I deal with it at length, as it has hitherto been regarded as British.

The difficulties surrounding *R. Blondæana* Rip. are increased by Ripart having described the four following varieties of it (as species), which Déséglise admits that he only imperfectly knows:—

R. vinetorum Rip. General characters of *Blondæana*, from which it differs in its more prickly petioles, stipules eglandular beneath, styles obscurely hispid, and flowers flesh-coloured.

R. controversa Rip. A small sub-shrub much more slender than *Blondæana* and *semi-glandulosa*, prickles more hollowed ("évidés"), stems thinner, and leaflets smaller. It differs especially in its glabrous styles; its peduncles and calyx-tube are almost as glandular as those of *andegavensis*.

R. prætérita Rip. Styles villous, fruit roundish, peduncles smooth or with rare abortive glandular setæ.

R. semi-glandulosa Rip. Peduncles glabrous, styles glabrous or obscurely hairy, sepals eglandular beneath.

There are no other foreign members of this subgroup known to me that are likely to occur in Britain, but the following species have sometimes (or some of them frequently) glandular midribs, though they are never glandular on the secondary nerves. The first six belong to subgroup ii, the last two to subgroup iii:— *R. dumalis* Bechst., *R. Carioti* Chab., *R. medioxima* Déségl., *R. canina* var. *squarrosa* Rau, *R. adscita* Déségl., *R. brachypoda* Déségl. & Rip., *R. Kosinsciana* Bess. (non auct. angl.), *R. hirsuta* Déségl. & Ozan.

GROUP OF ROSA DUMETORUM.

As with the *R. canina* group, I think it will be conducive to simplicity to divide this into four subgroups as follows :—

i. Leaflets uniserrate. Peduncles eglandular.
ii. Leaflets uniserrate. Peduncles glandular.
iii. Leaflets biserrate. Peduncles eglandular and glabrous.
iv. Leaflets biserrate. Peduncles glandular or hairy.

Subgroups i. and iii. correspond to Déséglise's subsection *Pubescentes*; ii. and iv. to his *Collinæ*; subgroup i. comprises Crépin's group of varieties represented by *R. dumetorum* Thuill., and subgroup ii. that typified by *R. Deseglisei* Bor.; subgroups iii. and iv. are his group of varieties with no special representative, which he says approach *R. tomentella* Lém.

This group is tolerably well defined from those of *R. canina* and *R. glauca* by the presence of hairs on the leaflets, if only in small quantity on the midribs. The distinction from *R. coriifolia* is also fairly well marked by the combination of rising sepals and a broad head of densely woolly styles seldom occurring in the present group, but it is not at all easy to distinguish by general characters from *R. Borreri*. I have given such characteristics as I can on p. 13, but seeing that species grouped under *Borreri* often have their secondary nerves eglandular, at least when mature, and that there is no definite line to be drawn by any other characteristic that does not break down either completely in certain species, or at least in individuals, the difficulty of separating these two groups will be appreciated.

Subgroup i. Leaflets uniserrate. Peduncles eglandular.

Key to British Species.

1 { Leaflets usually somewhat hairy above, and hairy all over beneath 2
  { Leaflets glabrous, rarely hairy above, and hairy on midrib or primary nerves beneath 4

2 { Flowers in large clusters; fruit small. Leaflets long, acute at each end. Peduncles occasionally weakly glandular *R. corymbifera* Borkh.
  { Flowers solitary or almost. Leaflets obtuse or only subacute 3

3 { Leaflets subacute. Prickles moderate, few, none on petioles. Flowers rose ..... *R. dumetorum* Thuill.
  { Leaflets broad, subobtuse. Prickles hooked, rather stout. Petioles armed. Flowers white ..... *R. obtusifolia* Desv.

4 { Styles subglabrous or hispid 5
  { Styles woolly 6

5 { Fruit ovoid. Leaflets medium ..... *R. urbica* Lém.
  { Fruit small, subglobose. Leaflets small, often much rounded below *R. canina* var. *frondosa* Baker.

6 { Prickles small, straightish. Leaflets medium, usually hairy on midribs only ..... *R. semiglabra* Rip.
  { Prickles stout, hooked. Leaflets large, broad, hairy on midrib and nerves ..... *R. platyphylla* Rau.

Rosa dumetorum

Thuillier, Flore des Environs de Paris, p. 250 (1799).

"Branches glabrous. Prickles geminate below leaves, strong, hooked. Leaves pubescent. Petioles minutely prickly all round. Leaflets 5–7, suborbicular-oval. Fruit globose, and peduncles naked. Branches with only two prickles under each leaf. Leaflets roundish-oval, pubescent. Fruit spherical, pedunculate, glabrous, Flowers white or rose."

Déséglise in "Essai Monographique," p. 125, has:—"Tufted, branched. Prickles compressed, dilated, arched, often geminate below leaves. Leaflets 5–7, all petioluled, *oval roundish*, uniserrate, *teeth ciliate, scattered adpressed hairy above, pubescent beneath*, terminal roundish or subcuneate at base. Petioles *very pubescent*, unarmed or with rare scattered setaceous prickles. Stipules *pubescent*, gland-ciliate. Auricles diverging, *the upper dilated*. Peduncles smooth, one to few. Bracts oval, *pubescent*, ciliate, usually longer than peduncles. Calyx-tube *ovoid*, glabrous. Sepals short, glabrous, salient in bud, reflexed, then *suberect* but deciduous. Styles hispid. Disc nearly flat. Flowers light rose. Fruit *roundish*, ripe early. *Carpels pedicellate.*"

Baker in Review, p. 27, says:—"Habit and prickles of normal plant. Leaflets flat, grey-green, thinly hairy all over above when young, greyer still and hairy all over beneath, thicker and softer than in any of the preceding [i. e. *urbica*, *platyphylla*, and *uncinella*]. Terminal large, broadly ovate, rounded or often cordate at base. Teeth simple, open, neither sharp nor deep. Petioles villous, but hardly at all setose or aciculate. Stipules and bracts hairy on the back, dentate, but hardly at all setoso-ciliate. Peduncles naked. Calyx-tube and fruit, with us, usually large, ovate-urceolate, or sometimes subglobose, green fruit more pliable than in the preceding, and ripening rather earlier. Sepals fully pinnate and leaf-pointed, reflexed after petals fall [the Monograph says "sepals often not fully reflexed"], hairy on back, but hardly at all gland-ciliate, deciduous before fruit ripens, which, with us, is in the last fortnight of September. Fruit in the large ovate-urceolate form fully an inch long." — "Flowers often deeper in colour than in the preceding. Styles villous" (Monog. p. 230).

Woods in Trans. Linn. Soc. xii. p. 217 (1817), says:—"4–6 feet. Branches weak, diffuse, olive, prickly. Prickles rather small, uncinate, subbinate, and scattered. Petioles with hairs and hooked prickles, sometimes even glandular. Stipules linear, glandular-serrate towards apex, pilose on edges, the floral ones a little broader. Bracts small, lanceolate, not broad nor long, but longer than stipules. Leaflets flat, 5–7, subshining, terminal elliptical, acute or subrotund, acuminate, usually much rounded at base, uniserrate, hirsute on both sides and pilose on nerves beneath, silky pilose when young. Peduncles 1–3, glabrous, or sometimes with scattered hairs, mostly equalling bracts, sometimes longer.

Receptacle ellipsoid or ovate, fuscous or olive, glabrous. Sepals triangular-elliptical, acuminate, usually glabrous, rarely pilose, compound. Pinnæ close, lanceolate, here and there incised, often quite entire on edges. Flowers flattish, reddish. Styles subincluded. Stigmas in a villous head. Fruit broadly ovate or subglobose, glabrous, red."

There are almost as many descriptions of *R. dumetorum* as there are authors to describe them, all of which descriptions differ more or less from one another, just as specimens do, and it has a formidable list of synonyms. I have reproduced four of the descriptions, *viz.* Thuillier's, the original author, supplemented by that of Déséglise, with Mr. Baker's and Wood's to show the British interpretation of the species.

There is great difficulty, at least in the herbarium, in separating this species clearly from *R. obtusifolia*, and, I might add, from *R. urbica*, while some of its forms run very near *R. coriifolia*. Its leaflets vary greatly in size, but less so in shape; most authors attribute considerable width to them, which is corroborated by specimens. In this respect they are intermediate between those of *R. obtusifolia* and *R. urbica*, being less broad and less obtuse than in the former, and less acute than in the latter, but there are many exceptions on all sides. They are quite simply serrate, the teeth being usually rather broad, shallow, and subobtuse, so as to be subcrenate. It will be noticed that Thuillier makes no mention of the serration. The prickles are less robust than those of *urbica* or *obtusifolia*, sometimes they are quite weak and even absent altogether, especially on the petioles. The supposed character of their being binate under the leaves may be seen in some specimens, but so they may in other species throughout the whole subsection. The petioles are usually more finely pubescent or felted, and less shaggy than in *R. obtusifolia*, but I can find no example to bear out Thuillier's "prickly all round." The leaflets, though almost always more hairy than those of *R. urbica*, do not differ in this respect from those of *R. obtusifolia*. They are sometimes glabrous above, but sometimes more hairy than in average *obtusifolia*. The peduncles are fairly frequently slightly pubescent but not constantly so, and this character may be found in other species. I have not, however, observed it either in *urbica* or *obtusifolia*. Woods's specimens show this hairiness well. All authors indicate a fruit approaching to subglobose, but specimens show it to be more often ovoid, or even elongate so that in this organ it is nearer to *R. urbica* than to *R. obtusifolia*. I cannot see that the sepals are even suberect, as Déséglise says. They often spread, but that is a common feature in the subsection. The flowers are light rose, as in *urbica*, those of *obtusifolia* being white.

Crépin remarks that there is much doubt as to what form should be designated *R. dumetorum* Thuill., which name now appears to be used only in an aggregate sense. He also remarks that herbarium specimens are not always distinguishable from *R. obtusifolia* Desv.

There is a small flowering-branch in herb. Déséglise which is from Thuillier's herbarium. It is almost unarmed. The petioles are rather thinly pubescent, quite eglandular and unarmed. The leaflets are of medium size, tending to large, rather broadly oval, or ovate, acute, not acuminate, practically glabrous above, thinly pubescent all over beneath, densely so on veins, which are very prominent, rather irregularly serrate, with acuminate forward-pointing teeth. Fruit ovoid or ellipsoid, rather small. Sepals reflexed, with well-developed incised pinnæ, most of the divisions being gland-tipped, but not gland-ciliate. Styles thinly hairy. Peduncles short, hidden by broad bracts.

There are six British examples in herb. Déséglise. A specimen from Millbrook, Cornwall, collected by Briggs, has remarkably long straightish rather stout prickles, small oval acute leaflets, hairy both sides, petioles densely felted, but also prickly, fruit small, ovoid-subglobose, sepals spreading, styles glabrous. Another specimen from Egg Buckland, Devon, has just similar prickles, but seems otherwise typical. A third specimen from Trevol, Cornwall, has more hooked prickles and broader less acute leaflets, less pubescent above. The leaflets look much more like those of *R. obtusifolia*, but Briggs had labelled it *R. dumetorum*, which name Déséglise accepted.

A specimen from Thirsk, collected by Mr. Baker, has oblong or elliptical leaflets, very thinly hairy on upper surface for this species; the petioles also are abnormally thinly hairy. The fruit is oblong. Another specimen from Sowerby is much more typical; it shows the binate prickles well, and its sepals rise above the disc.

An example collected by Woods, near London, has its leaflets quite hairy above, much more so than in Mr. Baker's Thirsk specimen; but the latter, in forwarding it to Déséglise, remarked that the leaflets are less hairy than in plants he usually calls *R. dumetorum*. Its peduncles are slightly hairy.

Most of the specimens in Woods' own herbarium have small finely serrate leaflets, and slightly hairy peduncles.

Rosa obtusifolia

Desvaux, Journal de Botanique, vol. ii. p. 317 (1809).

"Ovate calyx-tube and peduncles glabrous. Leaflets oval obtuse, puberulous above, villous beneath. Flowers white."—In *l.c.* vol. iv. p. 115 (1813), Desvaux reduces this to a variety of *R. canina*, differing from other hairy-leaved varieties in its short rather obtuse leaflets, oblong fruit and whitish flowers.

Déséglise, in "Essai Monographique," p. 121, has:—"Shrub. Prickles very robust, arcuate, dilated. Petioles *very villous*, prickly. Leaflets 5–9, all petioluled, oval rounded, almost obtuse, uniserrate, green, *pubescent* both sides, often reddish on young branches. Stipules *oblong*, gland-ciliate. Auricles short, diverging, the upper ones of flowering-branches dilated. Peduncles glabrous (very rarely glandular), usually in a corymb. Bracts oval, pube-

scent, longer than peduncles. Calyx-tube glabrous, *ovoid or globose*. Sepals glabrous beneath, very tomentose within, reflexed, deciduous. Styles short, hispid, *free* or *agglutinated*. Flowers white. Fruit globose."

In spite of its tolerable frequency, this species was not described by Mr. Baker in his Review or Monograph, and it is only incidentally referred to in the latter as a Continental species allied to his var. *concinna*.

According to the most recent views of many botanists, *R. obtusifolia* Desv. should be associated with *R. tomentella* Lém., and so far as I know the former species in the field, it certainly bears a considerable resemblance to *R. tomentella*, and might well be regarded as an uniserrate, eglandular variety of that species. But this view is inadmissible by the laws of nomenclature. If placed in the *R. Borreri* group at all, unless all the members thereof are retained as species, it must appear as the type, being the oldest species of the group. I will explain why that arrangement does not seem to me desirable. Taking Crépin's *Tableau Analytique* as a convenient basis for argument, we find that *R. tomentella* Lém. (and a non-British species *R. abietina* Gren.) is separated from *R. obtusifolia*, &c., by the following key characters :—"Leaflets more or less pubescent, rather often with the secondary nerves glandular, with glandular-compound teeth; outer sepals with numerous lateral appendages, the lower more or less foliaceous and deeply incised." The counterpart "not presenting these combined characters" leads directly to *R. obtusifolia* Desv., and eventually to *R. canina* Linn. But the final key characters for *R. tomentella* Lém. and *R. obtusifolia* Desv. have the following points in common :—"Leaflets pubescent, ordinarily rather small, roundish oval, shortly attenuate-acute at apex, and with secondary nerves very salient. Stem-prickles short, hooked, strongly thickened at the base." Now if I correctly estimate the views of modern botanists, the glandular secondary nerves form quite the most important of all the above characters, and in the first place this, which is one of the fundamental peculiarities on which the members of the *R. Borreri* group are founded, is absent from *R. obtusifolia*. It is true Crépin says only "rather often" glandular for *tomentella*, also that in individual specimens they are almost or quite absent from the secondary nerves, but this is probably on account of their deciduous nature, and they are always present on the midribs in the *Borreri* group, but quite absent from *obtusifolia*. The habit, which is not mentioned by Crépin, is probably also of great importance, and herein the two species in question generally agree, but both are subject to considerable variation, and looking to the wide range of habit covered by the members of the *dumetorum* group, it surely cannot be contended that a dwarf compact habit is a *primâ facie* reason for transferring *R. obtusifolia* to the *Borreri* group. The same line of reasoning applies to the shape of the leaflets, and I must confess my inability to see, either in the field or in the herbarium, that the nerves of either *R. tomentella* or *R. obtusifolia* are more prominent than in many other

species. The prickles of both are often strong and hooked, but so are those of some other species in the two groups, while at least equally often the prickles of *R. tomentella* and *R. obtusifolia* are slender, though generally a good deal curved, but sometimes they are straightish if specimens named by competent Continental botanists are to be relied upon. Finally, the leaflets of *R. obtusifolia* are quite simply and eglandularly toothed, while those of the *Borreri* group are at least somewhat, and almost always fully, glandular-biserrate.

My conclusions are therefore that *R. obtusifolia* is equally at home in either group, but if made the representative of the *Borreri* group we should have as the type a plant on the extreme limit of the group on the *dumetorum* side, instead of one which presents fairly the characteristics of its members.

Taking a fair average of the considerable number of specimens in Déséglise's herbarium, *R. obtusifolia* Desv. has its prickles often, but by no means always, strong-based and hooked; they are quite frequently nearly straight, or, if hooked, are quite slender. The petioles are very villous, but not much glandular. The leaflets are usually small, oval or broadly oval, or ovate, rounded or obtuse-angled, or cuspidate at the apex, thinly pubescent above, more densely so all over beneath. The nerves do not appear to be specially prominent. The peduncles are short, and fruit subglobose or broadly ovoid, very often in small clusters. The styles are short, varying a good deal in hairiness. Their agglutination, mentioned by Déséglise, is not apparent. The flowers are white.

There are only two British examples in herb. Déséglise. One from Ermington, South Devon, collected by Briggs, has small but stout long-based hooked prickles. Leaflets small, elliptical, mostly quite acute, not at all broad and subobtuse, less pubescent than usual beneath and subglabrous above. The styles are thinly hispid, and no fruit is formed. The other specimen from Botus Fleming, East Cornwall, has very strong hooked prickles, small, broad, obtuse leaflets, thinly pubescent above, densely so beneath. Fruit not formed, but the calyx-tube would probably have produced a subglobose fruit.

Rosa corymbifera

Borkhausen in Versuch einer forstbotanischen Beschreibung, p. 319 (1790).

"Fruit ovoid, naked. Peduncles naked, in much-branched clusters. Sepals smooth, gland-ciliate. Pistils short. Petioles woolly and prickly. Leaflets acute at each end, thin, hairy beneath. Stem prickly.—In height, stiffness, and prickly clothing like the foregoing [*R. canina* Linn.]. The leaflets are oval, roundish, little acute, coarsely but sharply serrate, dark green and hairy both sides, the upper less than the lower, not shining, and a little plicate on the nerves. Petioles woolly, with hooked prickles. Flowers often five to seven in an umbellate cluster. The middle

peduncle is solitary, the side ones either single or in two's or three's. Bracts lanceolate acute, gland-ciliate. Peduncles and ovate calyx-tube perfectly glabrous. The sepals are leaf-pointed, two are entire, two pinnate on both sides and one on one, all glabrous or glandular on the edges. Petals delicate rose, with white claws. Styles short, pistils scarcely visible. Fruit like the foregoing" [*R. canina* Linn.].

Déséglise, in "Essai Monographique," p. 127, has:—"Branches with dense prickles, dilated at base, curved, hooked, sometimes geminate below leaves. Petioles tomentose, *often with fine glands*, channelled, feebly prickly. Leaflets 5–7, shortly petioluled; terminal acute or rounded at base, *oval*, *acute at each end*, villous *chiefly beneath*; nerves a little salient, uniserrate; teeth mucronate, ciliate. Stipules broad, lanceolate, glabrous above, villous on backs. Auricles acute, diverging, sometimes gland-ciliate. Peduncles in a corymb, short, *villous at base*, especially when young, the lateral often branched, hidden by ovate-lanceolate, acuminate, ciliate, gland-fringed bracts. Calyx-tube *ovoid*, *glabrous*. Sepals with *long-lanceolate* appendages, *glandular-dentate*, *ciliate*, tomentose within, shorter than the corolla, reflexed, deciduous. Styles short, slightly hispid. Disc almost flat. Flowers light rose. Fruit *ovoid*, glabrous, orange-red.—Differs from *R. dumetorum* in villous peduncles, tomentose and glandular petioles, oval acute leaflets, and smaller, ovoid, orange-red fruit."

I cannot see that this species has any claim to be placed, as it is by Déséglise, in his subsection *Collinæ*, which covers the group of *Caninæ* having hairy leaflets and hispid-glandular peduncles. Déséglise says the peduncles are villous at the base, but its author expressly states that they are *perfectly glabrous*, and of the ten or a dozen sheets in herb. Déséglise very few have even a trace of villosity, most of them being quite glabrous and usually eglandular, whereas the peduncles of *R. dumetorum* are quite frequently villous. Thus the most important distinction from that species breaks down. Another difference which is not borne out by specimens is the presence of glands on the petioles, but they are certainly more often prickly than in *R. dumetorum*. The stipules are villous in both species. The leaflets of *R. corymbifera* are large, varying from elliptical to rather broadly ovate, sometimes, but not always, a good deal narrowed at the base, and acute or somewhat acuminate at the apex. They are quite simply serrate, nearly or quite glabrous above, and hairy all over beneath. The fruit is small, ovoid-urceolate, and in considerable clusters; it is said to be orange or yellowish-red, a character I cannot verify from dried specimens. The styles are hispid.

I follow Crépin, who places this species in his subsection *Pubescentes* (Primit. Monog.), corresponding with his varieties of the group *R. dumetorum* of his later arrangement.

There are two British examples in herb. Déséglise. One collected by Mr. Rogers in Bentley Wood, South Wilts, marked by him, "Handsome plant with strongly arching tall stems." It has many hooked prickles on stem and petioles. The leaflets are

attenuate at the base and acuminate at the apex, elliptical or oval, rather densely hairy on both sides. Peduncles long, in a cluster, almost imperceptibly glandular, one or two very slightly hairy at the base when young, all quite glabrous when old. Fruit small, ovoid or ellipsoid. Styles glabrous. The other specimen is by Briggs from near Plymouth, labelled by him "*R. collina* Jacq.," and marked by Déséglise, "*corymbifera?*" It is like Mr. Rogers's plant, but the prickles are remarkably hooked, and leaflets slightly irregularly toothed. The peduncles are many in a cluster, somewhat glandular, but quite glabrous. The sepals are glandular on the back, and have well-developed but eglandular pinnæ. The styles appear glabrous.

Rosa urbica

Léman in Bulletin de Science par la Soc. Philomatique de Paris, p. 95 (1818).

The original description (and the only one by Léman) will be found in the key reproduced under *R. tomentella* Lém. (p. 19).

Déséglise, in "Essai Monographique," p. 124, has :—"Tufted. Prickles unequal, compressed, dilated, curved. Leaflets *oval-acute*, green or scattered adpressed hairy above, *pubescent on nerves beneath*, *irregularly* uniserrate. Terminal narrowed or rounded below. Petioles pubescent and *prickly*. Stipules pubescent, gland-ciliate. Auricles diverging, pubescent beneath, glabrous above. Peduncles 1 to few, smooth, with a pubescent oval bract shorter than itself. Calyx-tube *ovoid-oblong*, glabrous. Sepals pinnatifid, glabrous, tomentose within, reflexed, deciduous. Styles *short*, *villous*. Disc nearly flat. Flowers light rose. Fruit ovoid or oblong.—Very near *R. dumetorum*, but leaflets acute, subglabrous above, pubescent on nerves only beneath. Petioles prickly. Calyx-tube ovoid-oblong, also fruit, not roundish."

Baker, Review, p. 26, says :—"Habit and growth of normal plant. Leaves full green or glaucous green, not flat, firm, glabrous above, hairy on ribs beneath. Terminal ovate, narrowed or somewhat rounded at the base, the serrations numerous, sharp, simple and connivent. Petioles villous, but only slightly setose, with 3 to 4 hooked aciculi. Stipules and bracts slightly hairy on back, a little setoso-ciliate. Peduncles naked. Calyx-tube and fruit broadly elliptical or subglobose. Sepals leaf-pointed and fully pinnate, hairy on back towards edges, slightly setoso-ciliate. Fruit as in the preceding [*lutetiana*]. Styles hairy."

This species differs from *dumetorum* and *obtusifolia* in the leaflets being less hairy. Some authors attribute a little hair to the upper surface, but it is usually glabrous, at least when mature. They are usually hairy only on the veins beneath, rarely on the whole under surface, and never more than quite thinly so. They are more acuminate than in either, and are certainly narrower than in average *obtusifolia*, though the difference from *dumetorum* is less marked. They are perhaps more often a little narrowed below than in the latter. In size the leaflets vary greatly, and

they are said to be unequally serrate, but specimens do not bear this out. The petioles are eglandular, but more prickly than in *dumetorum*. The fruit is more ovoid, *i. e.* longer in proportion than is usual in *R. obtusifolia* and *R. dnmetorum*, the sepals very rarely rise above the disc, and the styles are usually hispid, more rarely villous. Its flowers are rose. Examples can be found both of *R. obtusifolia* and *R. dumetorum* with leaflets quite glabrous above, and with ovoid fruit, so no well-defined line can be drawn.

A form with leaflets more hairy beneath, less narrowed below, and more densely woolly styles, has been named *R. hirta* Braun.

There is a specimen at Kew, from Gay's herbarium, collected and named by Léman. The prickles are strong, long and curved, or almost hooked. The leaflets are medium-sized, elliptical, narrowed at base, coarsely quite simply serrate, glabrous above, coarsely hairy all over beneath. The petioles are prickly, coarsely hairy, but not glandular. Stipules quite entire, hairy on edges, and slightly so on backs. The only peduncle is about three-quarters of an inch long. The petals have only just fallen, so the shape of the fruit cannot be determined, but the calyx-tube is narrow-ovoid. The sepals are spreading-reflexed, long, with few and narrow pinnæ. Styles hispid. As before suggested, it must not be taken for granted that Léman considered this to be a typical specimen. Its leaflets are considerably more hairy beneath than in specimens usually labelled *R. urbica* Lém. by modern authors.

There are three British examples in herb. Déséglise. One collected by Mr. Baker at Sowerby, and labelled by him, "near *dumetorum*, but sepals erect-patent," has elliptical acuminate leaflets, glabrous above, and hairy chiefly on the nerves beneath. The petioles are only thinly hairy and not prickly. The fruit is broadly ovoid, and styles villous. Peduncles very short. The sepals rise above the disc. The prickles are few, slender, and hooked. A specimen collected by Briggs at Yeo, Yealmpton, Devon, has rather large broadly elliptical or oval leaflets quite glabrous above, hairy on veins beneath. Fruit quite globose. Styles hispid. Déséglise had at first labelled this *R. obtusifolia*, probably on account of the broad leaves and globose fruit. Another specimen by Briggs, from Laira, South Devon, is almost identical with the Yeo specimen.

Déséglise quotes the following five species as forms of *R. urbica*, which he only knows imperfectly, but does not wish to detract from their specific value:—

R. ramealis Puget. General characters of *R. urbica* Lém., from which it differs by its unarmed petioles, leaves glabrous above, bracts glabrous, styles hispid, fruit obovoid.

R. semiglabra Rip. General characters of *R. urbica* Lém., from which it differs in the petioles and midribs only being villous. This and the next, being British species, will be dealt with more fully below.

R. hemitricha Rip. General characters of *R. urbica* Lém., from which it differs in its villous and glandular petioles and biserrate leaflets.

R. trichoneura Rip. General characters of *R. urbica* Lém., but differing in its midribs and lateral nerves villous, its flowers rose, its styles feebly hispid, its leaflets are also simply toothed.

R. obscura Pug. Petioles with rare glands. Leaflets hairy all over beneath (in Puget's specimens and his own note thereon). Flowers large, white or very light rose. Fruit elongate, ovoid, or elongate-obovoid. Styles lightly hispid.

Rosa canina var. frondosa.

Baker, Monograph of British Roses, in Journ. Linn. Soc. xi. p. 229 (1869).

Mr. Baker, wrongly supposing this to be synonymous with *R. frondosa* Stev., gives it only the following description:—"Differs from the last [*R. urbica*] by its small flat ovate-oblong leaflets, much rounded at the base, and small subglobose fruit.—Very near *obtusifolia* Desv., but the leaflets naked above and less hairy below."

As Mr. Baker has since pointed out, this has nothing to do with Stevens's species, which has long narrow leaflets, quite glabrous beneath, and an elongate ellipsoid calyx-tube. I can get no light thrown on Mr. Baker's variety from Déséglise's herbarium, as it is not represented therein, nor, so far as I know, is it mentioned by any foreign author. It may be regarded as a less hairy variety of *R. obtusifolia* Desv., and comes very near the Continental *R. trichoneura* Rip., or between that and *obtusifolia*.

A specimen at Kew, collected by Bloxam, and named by Baker, has small leaflets, rounded at base, quite hairy beneath, and with very pubescent petioles. They are irregularly serrate, or just biserrate, which is untypical. Styles quite densely hispid. I have only seen one specimen collected by Mr. Baker, in the National Herbarium, from Matlock Tor, Derbyshire. It has quite small simply serrate leaflets, not rounded, but somewhat narrowed below, hairy only on the veins; petioles pubescent and somewhat prickly, not glandular. Fruit very small, globose; peduncles smooth; styles subglabrous.

Mr. Baker quotes Woods's *R. dumetorum*, No. 93, as synonymous. It was gathered at Pound's Bridge, Kent, and has small leaves rounded at the base, hairy only on veins beneath. Fruit small, broadly ovoid. Styles hispid.

Other British specimens by various collectors vary so greatly that it is impossible to generalize from them. Many of them have quite large leaflets, and not uncommonly they are fully glandular-biserrate, and sometimes quite as densely hairy beneath as in average *R. obtusifolia*, also they are as often narrowed as they are rounded at the base. Occasionally even the peduncles are glandular. The only character they almost all have in common is a globose fruit, but even that is by no means always small. There is no doubt that there is a mixture of *R. obtusifolia*,

R. dumetorum, and other species of this group in the cover. *R. canina* var. *frondosa* Baker should be like *R. obtusifolia*, with small, less hairy leaflets and small subglobose fruit; also, Mr. Baker tells me, it has sharper, less open teeth.

Rosa semiglabra

Ripart ex Déséglise, Cat. Raisonné, p. 204 (1877).

I have no other description than that quoted above under *R. urbica* Lém. (p. 72).

This is a very unsatisfactory species, and at the best is only a very slight variety of *R. urbica* Lém. Crépin differentiates it from two or three non-British allies by the petioles of its flowering-branches being unarmed, a very unstable character, which is not borne out by specimens. It seems frequent on the Continent.

I have seen two of Ripart's own gathering. Their prickles are rather small, straightish, and declining from rather small bases, so that they are subconical. Some flowering-branches are quite prickly, but one or two are almost unarmed. The leaflets are medium to large, subsimply serrate, oval or ovate, with rounded base. In one the petioles are thinly hairy, with the leaflets thinly hairy *all over* beneath. The other has more hairy petioles, but the leaflets are only thinly hairy on the midrib or even altogether glabrous. All the petioles are more or less prickly. The sepals have broad incised pinnæ, hardly gland-ciliate. The fruit is rather large; in one it is ovoid and rather shortly peduncled, and in the other obovoid and longer stalked. The styles are villous or at least densely hispid. The sepals have all fallen.

There are three British examples. One by Briggs from Efford, South Devon, labelled by him "*R. urbica* Lém.?" has medium to large elliptical leaflets, hairy on midrib, and slightly so on side veins. Petioles quite villous or pubescent. Fruit quite globose, on peduncles of medium length. Styles subglabrous. Another specimen, similarly labelled, from Yealm Bridge, is very like the last, but the leaflets are more narrowed below, and even more hairy on the side nerves. Fruit quite globose, and styles thinly hispid. An example from Thornton-le-Sheet, North Yorks, by Mr. Baker, has straightish but stronger prickles than usual. Petioles densely pubescent. Leaflets ovate, secondary nerves decidedly but thinly hairy. Fruit globose or shortly ovoid. Styles almost glabrous.

It will be seen that one of Ripart's and all three British specimens are hairy more than on midribs only. In fact, the British specimens seem to me to fit *R. trichoneura* Rip. admirably, and Ripart's differ only in their villous styles. Specimens of that species, however, show that the styles are quite hispid, not feebly so, as in the description, which will be found above under *R. urbica*; and, as pointed out under var. *frondosa* Baker, that variety also runs very close to, or indeed may be identical with, *R. trichoneura* Rip.

Rosa platyphylla

Rau, Enumeratio Rosarum, p. 82 (1816).

"Ovoid calyx-tube and peduncles glabrous. Leaflets orbicular-oval, acute, glabrous above, glaucescent beneath, villous on midrib and veins, subsimply serrate, serrations ciliate. Shrub, often 10 ft. high, robust, prickly. Prickles scattered and stipular, often geminate, strong, hooked. *Petioles tomentose all over, eglandular, with often strong hooked prickles.* Stipules denticulate, ciliate, shining, green above, glaucescent beneath. Leaflets *orbicular-oval*, 1½ in. by 1 in., simply serrate at base, biserrate towards apex, serrations cartilaginous, *ciliate*, full green and *glabrous* above, *glaucescent* beneath, *villous on midrib and chief nerves*. Peduncles glabrous, six, corymbose or cymose. Calyx-tube *ovoid-globose*, glabrous. Sepals tomentose within and on limb, eglandular, dilated and foliaceous at apex, inciso-serrate, appendiculate, appendages lanceolate, remotely serrate, glandular, exceeding the small red corolla. Fruit as in *canina*. Near *R. canina*, but leaflets three or four times larger, more or less acuminate, sometimes ciliate, not glandular, midrib, veins, and petioles tomentose."

Déséglise, in "Essai Monographique," p. 125, gives practically the same description, adding:—"Styles villous, disc not much salient. Flowers light rose. Fruit *ovoid*. Differs from *R. dumetorum* in leaflets broader, glabrous above, villous on nerves beneath. Calyx-tube ovoid-globose. Peduncles glabrous, or villous, especially when young. Fruit ovoid."

Baker, in Review, p. 26, has: "Habit and prickles of normal plant. Leaves flat, grey-green and glabrous on upper surface, glaucous and hairy on ribs beneath, firm, serrations moderately sharp, connivent, somewhat unequal but not truly double. Terminal varying from ovate, rounded at base, to broadly obovate, in fine specimens 2 in. by 1½ in., petioles densely villous, but hardly setose, with several hooked prickles. Stipules and bracts slightly hairy on back and a little setoso-ciliate. Peduncles naked. Calyx-tube and fruit broadly ovate or subglobose. Sepals leaf-pointed and fully pinnate, pubescent on back, but hardly at all gland-ciliate, reflexed after petals fall. Styles villous."

Crépin has seen Rau's type, and says its leaflets are quite glabrous above, and pubescent only on veins beneath. They are not very large, but, on the contrary, rather small or medium, not orbicular but oval, and with some of the teeth double. Calyx-tube ovoid, not ovoid-globose.

It appears to be a common species on the Continent. The majority of specimens have prickles strong with long bases. Leaflets always large, broadly oval, but seldom or never orbicular, sometimes only oval or even elliptical, almost always quite simply though coarsely serrate, the teeth not being ciliate or villous as described, though they are not glandular. Petioles rather thinly pubescent, midribs and veins quite thinly so, upper and under surface glabrous. The peduncles are often long, but I have not

seen them hairy, as Déséglise says they are when young. The fruit is usually large and ovoid, sometimes ellipsoid, but rarely globose, and I cannot see that the calyx-tube is globose, the shape assigned to it and to *R. coriifolia* to separate them from their allies. The styles are villous.

There are three British examples. A specimen from Warleigh, Devon, collected by Briggs, and labelled by him "*R. dumetorum*," has leaflets of medium size, truncate below, tapering to tip, simply serrate, teeth with long points, thinly hairy all over beneath, and some leaflets thinly hairy above. Fruit not formed. His specimen from Weston Mill, South Devon, labelled by him "*R. platyphylla*," though queried by Déséglise, seems to me to agree much more closely with the description of that species than does the Warleigh plant. A specimen by Mr. Baker from Thirsk, labelled "*R. platyphylla*," has large elliptical leaflets glabrous above, hairy on veins beneath. No fruit. Styles rather densely hispid. Its flowering-branches are unarmed, a character relied upon by Crépin in his key to separate *R. sphærocarpa* Pug. from *R. platyphylla* Rau, but not mentioned by any other author.

Foreign Species of Subgroup I.*

The following, from their Continental distribution, are likely to be found in Britain :—

Styles glabrous or hispid, but not woolly :—

Fruit globose :—

R. sphærocarpa Pug. Leaflets large, broad, subobtuse, hairs almost confined to midrib. Petioles unarmed and flowering-branches almost so. Flowers white. Fruit large, subglobose. Styles hispid or thinly so. (Near *R. platyphylla* and *R. platyphylloides*.)

Fruit ovoid :—

R. platyphylloides Déségl. & Rip. Leaflets medium, oval, hairy on nerves and occasionally all over, but not glaucous beneath. Fruit of medium size, ovoid. (Like a small *R. platyphylla*, but leaflets less hairy, not glaucous beneath. Styles not woolly.)

R. jactata Déségl. Leaflets large, broad, subobtuse, hairy on nerves and occasionally all over, and glaucous beneath, sometimes irregularly serrate. Fruit rather large, ovoid or obovoid. Styles hispid or thinly so. (An unsatisfactory species, described by Déséglise to cover plants which have been erroneously referred to *R. uncinella* Bess.)

R. hispidula Rip. I mention this as a protean species to which many British examples might be referred. Déséglise describes it as a subspecies of *R. Deseglisei* Bor., Keller doing the same, adding the remark that some of Ripart's specimens should come under *R. urbica* (presumably having smooth and glabrous peduncles), and that others are so weakly hairy that they should be placed in *R. canina*.

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* In addition to those mentioned on p. 72.

Déséglise credits it with small but stout prickles, small leaflets, villous midribs and petioles, short smooth or weakly aciculate peduncles, hispid styles, white flowers, and ovoid or subrounded fruit. Ripart, in his key, gives it hairy petioles but not midribs, and associates it with *R. fallens*, i. e. with glabrous and smooth peduncles. One of his two specimens has rather large prickles, large subcordate leaflets, quite glabrous midribs, and smooth glabrous peduncles. The other has similar prickles, rather small leaflets narrowed at base, and hairy all over beneath, with peduncles slightly glandular and villous. Fruit large, ellipsoid, urceolate, and globose on the same specimen.

Fruit oblong or obovoid :—

R. imitata Déségl. Flowering-branches prickly, petioles slightly so. Leaflets small, elliptical, ashy-green, and slightly hairy above, thinly so all over beneath. Fruit pyriform. Flowers large, white. Occasionally the peduncles are hairy or abortively glandular when it is *R. pyriformis* Déségl.

Styles villous or woolly :—

Fruit subglobose :—

R. globata Déségl. Leaflets rather small, broad, subobtuse, hairy only on midribs. Lower petioles unarmed. Peduncles short. Flowers light rose. Fruit rather large. Sepals often spreading. (Allied to *R. semiglabra* Rip. and *R. globularis* Franch.)

R. cinerosa Déségl. Leaflets small, broadly oval, ashy pubescent both sides. Fruit subglobose. Flowers rose. (I have seen neither full description nor specimens.)

R. opaca Gren. non Fries. Leaflets large, suborbicular, hairy below. Fruit large, subglobose. Sepals rising. (Near *R. platyphylla* Rau, or a hairy-leaved *R. sphærica* Gren.)

Fruit ovoid :—

R. erythrantha Bor. Leaflets small, oval, glabrous above, hairy nerves beneath. Fruit ovoid. Flowers bright rose.

R. uncinella Bess. Prickles large, hooked. Branches unarmed. Leaflets medium, slightly hairy above, irregularly serrate. Fruit ovoid. (A species not understood by Crépin or Déséglise. The plant described by Mr. Baker in his Review, and referred to in the Monograph, was probably only a form of *R. dumetorum*.)

The following species, as well as examples of the *R. coriifolia* group, when their styles are less villous than usual, might be mistaken for this subgroup :—

R. syntrichostyla Rip., see *R. canina*, subgroup i., p. 32.
R. sylvularum Rip., „ „ „ ii., p. 45.
R. sclerophylla Scheutz, see *R. Borreri*, p. 22.
R. Deseglisei Bor., see next subgroup, p. 78.

Subgroup ii. Leaflets uniserrate. Peduncles glandular or villous.

Key to British Species.

1 { Peduncles long, hairy, rarely weakly glandular. Prickles, leaflets, flowers and fruit small ..... *R. Deseglisei* Bor.
1 { Peduncles moderately glandular-hispid. Leaflets seven 2
1 { Peduncles densely prickly-glandular. Leaflets large, five. Prickles slender, straightish ..... *R. collina* Jacq.

2 { Leaflets ellipsoid, acute each end, glabrous above, thinly hairy nerves beneath ..... *R. incerta* Déségl.
2 { Leaflets broadly oval, hairy both sides *R. canina* var. *concinna* Baker.

Rosa Deseglisei

Boreau, Flore du Centre de la France, iii. p. 224 (1857).

"A low shrub, with diffuse flexuous branches. Prickles small, with elongate discoid bases, arched or falcate. Petioles *villous-tomentose*, armed with small prickles or unarmed. Stipules narrow, villous beneath, fringed with some glands at the tip. Leaflets 5, small, *pale green*, villous above and more so beneath, *oval acute, or elliptic*, with callous mucronate teeth. Peduncles solitary or geminate, *villous*, with some *scattered* glandular setæ (more rarely glabrous). Calyx-tube glabrous, ovoid or roundish. Sepals *pubescent*, pinnate, with foliaceous appendages, short. Styles short, hispid. Disc a little conical. Fruit small, *ovoid or roundish*. Flowers small, light rose."

Déséglise, in "Essai Monographique," p. 128, gives an almost identical description, but says that the sepals are first reflexed, then erect, but deciduous. Also that it differs from *R. dumetorum* in its oval acute leaflets, glandular and villous peduncles, pubescent sepals, and smaller roundish fruit.

The peculiarity of this species is that its peduncles, though sometimes weakly glandular, are almost always more or less hairy, which character only exists exceptionally in most other species.

I have not seen a specimen named by Boreau, and the majority of those placed in the *R. Deseglisei* cover by Déséglise exhibit such great variations, and have been labelled by their collectors with such a variety of names, that it is impossible to generalize from them. I have selected six sheets which have been named with certainty by reliable botanists as the subject of the following notes. The prickles are few, not large, but often a good deal hooked. In five out of the six the flowering-branches are unarmed. The petioles are villous and unarmed or nearly so. The leaflets on three sheets are small, on two medium, and on one large; they are fairly regularly elliptical, and only subacute, rather rounded at the base; they are simply serrate, and very thinly hairy above, often only on the top of the midrib, but all are a good deal hairy all over beneath. The peduncles are always rather long, usually but not always more or less hairy, rarely more than quite thinly

hispid-glandular, and most frequently not so at all. The sepals are somewhat hairy on the back, especially towards the points, but not glandular; they are loosely reflexed. Fruit ovoid, tending to ellipsoid, sometimes quite ellipsoid. The styles are hispid, but thinly rather than densely so.

The only British specimen in herb. Déséglise is one collected by Mr. Rogers at Trusham, and named with doubt by Déséglise. It has rather small leaflets, hairy on both sides, petioles prickly, peduncles very slightly hispid-glandular, but not hairy; styles glabrous; fruit not formed.

Although the only authenticated British specimen which I have seen is named with doubt, I retain this species in our list, as I believe that it has been satisfactorily identified from several stations. It is quite a frequent Continental species. Crépin thinks that *R. Deseglisei* Bor. might be mistaken for a *stylosa* form, but for its hairy styles not agglutinated into a column, and its dilated upper stipules.

Rosa incerta

Déséglise in Cat. Raisonné, p. 215 (1877).

"Shrub, with prickles of branches dilated at base, hooked Stems arching with flexible ascending branches. Petioles villous, prickly, the lower ones of the branchlets unarmed. Leaflets 5–7, oval-elliptical, glabrous above, *villous on nerves beneath, the villosity deciduous except on midrib*, uniserrate, *some of the teeth deep, with accessory denticles*. Stipules narrow, *glabrous*, with diverging auricles. Peduncles solitary or 2–4, *weakly aciculate*; bracts glabrous, longer than peduncles, often ending in a denticulate point. Calyx-tube ovoid, glabrous. Sepals spathulate at tip, *with scattered fine glands* on back, two entire, three pinnatifid, deciduous before fruit changes colour. Styles hispid. Fruit ovoid, red, medium."

This species was founded by Déséglise on specimens sent to him by Mr. Baker from Yorkshire. He treats it as a subspecies of *R. corymbifera* Borkh., to which he says it is very closely allied, differing in its sepals having scattered glands on the back, its styles more hispid, and its leaflets not quite simply serrate. He might have added what seems to me the most important character, namely, that the peduncles are thinly glandular-hispid. It appears to be an endemic species, and though so closely allied to *R. corymbifera* Borkh., it just oversteps the subgroup division in its glandular peduncles, and therefore in a mere systematic arrangement might appear distinct, just as the absence of glands beneath the leaflets removes *R. obtusifolia* Desv. from its close ally *R. tomentella* Lém. Both the British specimens of *R. corymbifera* bridge over the gap between the type of that species and *R. incerta* Déségl.; the Bentley Wood specimen in its slightly glandular peduncles, and the Plymouth example in its gland-backed sepals and slightly irregularly toothed leaflets.

Mr. Baker's No. 38, from Sowerby, is very like Briggs's *R. corymbifera*. Its prickles are curved not hooked. Leaflets elliptical, narrowed at each end, very slightly irregularly serrate, hairy only on midrib beneath. Stipules glabrous. Peduncles few in a cluster, very slightly glandular-hispid. Sepals spreading at right angles to axis, slightly glandular on back. Fruit medium or rather small, ovoid, or ellipsoid-ovoid. Styles almost glabrous. No. 101, from Studley Woods, is very similar, but the leaflets are slightly hairy all over beneath when young, though very slightly hairy on midrib only when mature, and hardly irregularly toothed. Petioles very slightly glandular. Stipules hairy. Peduncles solitary, decidedly glandular-hispid. Some sepals glandular on back, others not. Styles not visible, the flowers being in bud. A specimen from Thirsk is very little armed. Petioles pubescent, scarcely prickly, eglandular. Leaflets rather large, but narrow-elliptical, hairy on nerves, somewhat irregularly serrate. Peduncles short, weakly hispid. Fruit small, urceolate. The sepals have fallen; Mr. Baker writes that they are "much setoso-ciliate," but says nothing about their backs. Styles hispid.

Rosa collina

Jacquin, Flora Austriaca, ii. p. 53 (1774).

"Stem terete, glabrous, with strong pungent shining and **fuscous recurved thorns.** Young branches reddish. Leaflets 5, rarely 7, oval or somewhat subrotund, acute, sharply serrate, very shortly petioluled, firm, dark green, glabrous, subincanous on back, villous on nerves and veins, also on edges, teeth cartilaginous, midrib prickly, with short white hairs and rare reddish stalked glands. Stipules acute, the edges white villous, often also gland-ciliate, the rest glabrous. Peduncles hispid, with long-stalked glands. Germen ovate, quite glabrous or with some glands in the lower part. Sepals villous inside and on the edges, but glandular on the back and edges, two or three pinnatifid. Petals obcordate, flesh-coloured or pale. Stigmas villous. Fruit ovate, very shining, glabrous, red or orange, just like that of *canina*."

Jacquin's plate 197 shows small slender hooked prickles with elliptical bases. Leaflets almost always 5, not more than broadly oval, mostly quite obtuse or even rounded at apex. Petioles sub-glabrous, but a good deal glandular, the glands extending a very short way up the midrib. (These glands show most conspicuously in the plate, and are no doubt greatly exaggerated.) None of the peduncles are visible, being covered by bracts or leaflets, but a detached one is shown covered with long *eglandular* setæ. The omission of the glands is, I suppose, due to an error in printing. The petals are large, rather pale rose, paler towards claw. The fruit is smooth, suburceolate or ovoid.

Déséglise's description in "Essai Monographique," p. 129, is almost identical, but he says the prickles are slender, recurved or straightish, which agrees with Jacquin's plate rather than with his description.

This is a species which has been considerably misunderstood on the Continent, as well as in Britain. Crépin regards Jacquin's plant as a *gallica* × *canina* (the second parent including of course *R. dumetorum*). Keller places it in his *gallica* × *dumetorum* series, saying that it is a complex aggregate, though some Austrian botanists still use the name in a segregate sense. Rouy takes much the same view, but Déséglise looks upon the true *R. collina* Jacq. as a definite species and not a hybrid, quoting a species he received from the classic locality, which he says is identical with his own plant described in the "Essai Monographique," also with the specimen in the Linnean herbarium, and with Jacquin's plate. I have seen the specimen referred to, in herb. Déséglise. It was gathered by Kerner at Oberbergen, near Mantern, in Austria. It has the prickles on the barren stem hooked, and on the flowering-branches slender, straightish. Petioles densely pubescent, but hardly at all glandular. Leaflets 5, large, broadly oval, very coarsely (broadly and shortly) simply serrate, with fine, short, scattered, woolly hairs above, pubescent on nerves beneath, not glandular even on midrib. Peduncles short, 1 to 4, prickly and hispid-glandular. Pinnæ of sepals broad, well developed, more or less hairy but not glandular. There is no fruit, but the calyx-tube in flower is shortly ovoid or subglobose, glabrous. Styles hispid, not at all woolly. Flowers not large. The absence of glands from the midribs and their fewness on the petioles is untypical, but the plant has a peculiar appearance due to its leaves usually having only five broad very coarsely serrate leaflets. The very strong hispidity of the peduncles is also characteristic.

There are a considerable number of specimens in herb. Déséglise by various collectors, some of them named with doubt. Taking a general view of those which most bear the stamp of authenticity, they have rather slender not hooked prickles, as in Jacquin's plate. The leaflets are usually five, rarely seven; they are broadly oval, but not always large, usually obtuse, rarely cuspidate, never acute or acuminate. The upper surface is sometimes pubescent, the lower generally more or less densely so all over, not on nerves only; they are seldom at all glandular on midrib, and never much so. Their toothing is simple and coarse. Petioles rather thinly pubescent, not much glandular. The peduncles are prickly-glandular, but the calyx-tube very rarely so. The styles are hispid, not villous. Fruit of medium size, ovoid. Sepals strongly gland-ciliate, but usually eglandular on the backs.

There are five British specimens, all collected by Briggs in Devon and Cornwall, but four of these were labelled *R. collina* Jacq. with doubt by Déséglise. These four all have slender, slightly curved or straight prickles. Petioles not much pubescent but a good deal glandular, the glands extending slightly to the midrib, often also with many mixed prickles. The leaflets are broad, but not always large, slightly biserrate, not much pubescent beneath, often only on nerves. The peduncles are hispid-glandular. Fruit quite ellipsoid. Styles villous or densely hispid. The fifth

specimen, from Calstock, East Devon, is named without any query by Déséglise. It has no prickles. Its leaflets are large, close-set and overlapping, usually only five, broadly ovate subcordate, broadly, shallowly, simply serrate, hairy all over beneath, but not glandular. Petioles pubescent, not very glandular. Peduncles thinly hispid-glandular. Young calyx-tube ellipsoid. Sepals very little glandular on edges, and not at all so on backs. Styles hispid. Crépin gives his opinion that this specimen is *R. gallica* × *canina*, that is, *R. collina* Jacq., so that we have both Déséglise's and Crépin's authority for claiming this as a British plant, though off type in being unarmed and having eglandular midribs. The absence of glands in other species which should have them is not unfrequent, and should not of itself vitiate the determination. The peculiar appearance given by the large, broad, obtuse, coarsely serrate leaflets, often only five in number, is not presented by any other British species that I am acquainted with. The fact that *R. gallica* Lém. is not a British species is of no importance, as it is frequently cultivated in gardens, from which spontaneous hybrids may arise. Personally, however, I feel disposed to agree with Déséglise that *R. collina* Jacq. is not a *gallica* hybrid, practically all of which have more or less mixed armature. The slender prickles and five leaflets are, however, in favour of a *gallica* influence.

There are several plants which have been mistaken for *R. collina* Jacq. Déséglise says that *R. dumetorum* and *R. obtusifolia* are frequently named so. Does he mean that those two species may sometimes have glandular peduncles, or that some botanists have supposed that *R. collina* may have them smooth? I have seen instances of neither. Crépin remarks that *R. Deseglisei* Bor. and its varieties are frequently named *R. collina* Jacq. in Britain.

R. dumetorum var. *glandulosa* Gren. differs from type *dumetorum* only in its glandular-hispid peduncles. I have not seen authentic specimens, but they can hardly have the peculiar leaflets of the true *R. collina.*

R. canina var. *collina* Gren. & Godr. has peduncles and often calyx-tube hispid-glandular. Leaflets roundish oval, pubescent below and sometimes above. Styles woolly. This reads more like Jacquin's plant, but the description is insufficient.

R. dumetorum var. *pseudo-collina* Christ (which Keller says is synonymous with var. *glandulosa* Gren., and with *R. collina* auct. non Jacq.). Compact, very prickly. Petioles very densely prickly. Leaflets 7, roundish oval, very close set, touching or overlapping, thinly adpressed-hairy above, downy all over beneath, densely ciliate. Flowers several together. Peduncles with few or many glands, even reaching calyx-tube. Sepals densely glandular on back. Flowers small, pale rose. Styles short, woolly. Fruit almost globose. Christ says it differs from Jacquin's plant in the smallness of all its parts, its seven leaflets, broader prickles, longer peduncles, less hispidity, and in its whole habit.

R. fallaciosa Déségl. (*R. collina* Bor.) and *R. Lloydii* Déségl.

(*R. collina* Lloyd) are obvious *gallica* hybrids, having the characteristic aciculate armature of that group.

R. collina "Jacq.," as described by Mr. Baker in Seemann's Journ. Bot. iii. p. 52, has been shown to be *R. leucochroa* Desv., see Journ. Bot. 1877, p. 316.

R. Kosinciana auct. angl. is certainly not Besser's species, the latter having glabrous leaflets, and being allied to *R. andegavensis* Bast. There is so much variation in British specimens labelled *R. Kosinciana* that I am unable to say what it is.

Rosa canina var. concinna

Baker in Monograph of British Roses, p. 233 (1869).

"Prickles very much hooked. Leaflets very small, the terminal one 8–9 lines long, flat, broad, obovate, thinly downy above when young, hairy all over beneath; the teeth simple, moderately open; the petioles pubescent, but scarcely at all setose; the calyx-tube small, broad, ovate; the styles slightly protruded, thinly hairy.—The representation of the Continental *obtusifolia* in this group" [*i. e.* Series *Ecristatæ*, with aciculate peduncles].

I have not seen a specimen of this collected or named by Mr. Baker, the only one I have seen at all being one of Briggs, from Honicknowle, near Plymouth. It has rather large, moderately stout, much hooked prickles; leaflets large, very broad, rounded or narrowed below, cuspidate, hairy both sides, or glabrous above when old, with coarse, simple, forward-pointing teeth. Petioles thinly pubescent, but hardly at all glandular, with hooked prickles. Some peduncles quite glandular setose, others only slightly so. Fruit small, ovoid. Styles protruded, loose, subglabrous. Sepals much pinnate, glabrous or slightly hairy on back. This specimen, it will be seen, agrees very well with Mr. Baker's description, except for its large leaflets; if they were "very small" it would certainly run near *R. obtusifolia* Desv. with hispid peduncles. No foreign author mentions it, and the nearest Continental species seems to be *R. trichoidea* Rip., a variety or subspecies of *R. Deseglisei* Bor., the description of which corresponds very closely with that of var. *concinna*. Its flowers are white, the colours of those of var. *concinna* not being stated.

Foreign Species of Subgroup II.

The following may occur in Britain:—

A. Prickles usually weak or small, few or none on flowering-branches and petioles:—

R. arcana Déségl. A subspecies of *R. Deseglisei* Bor., with a low tufted habit; leaflets oval, acute, hairy both sides, irregularly serrate. Flowers small, pale rose. Fruit small, roundish. Styles in a very villous head.

R. trichoidea Rip. Tall. Prickles small, hooked. Leaflets broadly oval, subobtuse, hairy both sides. Flowers white. Fruit obovoid-globose. Styles loose, woolly.

B. Branches prickly, with stout hooked prickles. Petioles prickly :—

R. pyriformis Déségl. Tall. Leaflets ashy-green, hairy both sides. Flowers white. Fruit pyriform. (Almost identical with *R. imitata* Déségl., but with hispid peduncles. See Subgroup i, p. 77.)

R. hispidula Rip. Low. Leaflets dark green, glabrous above, hairy midrib beneath. Flowers white. Fruit ovoid or subglobose. (See under Subgroup i, p. 76.)

Subgroup iii. Leaflets biserrate. Peduncles eglandular and glabrous.

Key to British Species.

Leaflets hairy above, at least when young, grey and thinly hairy all over beneath ..... *R. canescens* Baker.
Leaflets glabrous above, usually hairy only on midribs and nerves beneath ..... *R. hemitricha* Rip.

Rosa canescens

Baker in Review of British Roses, p. 28 (1864).

"Habit and prickles of normal plant. Leaves grey-green above, tolerably firm, and thinly hairy all over when young, but hardly so when mature, very grey beneath, and thinly hairy all over, but not at all glandular. Terminal not more than ovate, rounded at base, serrations open, not deep, furnished with 2–3 gland-tipped accessory teeth each side. Petioles villous, very slightly setose, with 2–3 hooked aciculi. Stipules and bracts hairy on the back and closely setose-ciliate. Peduncles naked. Calyx-tube broadly ovate, scarcely urceolate. Sepals hairy on the back, leaf-pointed and copiously pinnate, closely setose-ciliate, reflexed after petals fall. Fruit obovate or subglobose, stone-hard when green, not ripe till October, by which time the sepals have fallen. — Has a resinous scent. Leaves like *tomentosa*, but fruit of *canina*."

If we confine our attention to the description in the Review, and to the type, Mr. Baker's No. 20, there should be no great difficulty in diagnosing and locating this species; but in the Monograph it is passed over with a mere remark under *R. cæsia* var. *incana* Borr., which variety certainly belongs to the *R. coriifolia* group, though Mr. Baker does not place it therein. He there remarks that "*R. canescens* Baker, Review 28, *exsicc.* 20, is a form with similar leaves, but with the fruit and sepals of the type" [i. e. *canina*]. I gather from this that he did not regard it as bearing more than a superficial resemblance to var. *incana*. On the other hand, there is a specimen at Kew, from Coquetdale, labelled *R. canescens* by Mr. Baker, which would justify the above affinity, but the specimen is quite different in most of its characteristics from No. 20, and bears the well-marked features of the *R. coriifolia* group in its broad head of densely woolly styles; it

also has the broad stipules usually found in that group. It is obvious, therefore, either that Mr. Baker allowed so much latitude to this species as to break down such a classification as I have adopted, or that he has been mistaken in associating plants so dissimilar. I cannot, consistent with my group definitions, accept the Coquetdale plant as *R. canescens*.

Mr. Baker's No. 20, from Thirsk, at the National Herbarium, has rather small roundish oval leaflets, which are quite biserrate. The petioles are pubescent and somewhat glandular. The sepals have broad, strongly glandular-dentate pinnæ, but the flowers being only in bud, no characteristics can be derived from fruit and styles. A sheet bearing the same number at Kew has much larger leaflets, and is in a more advanced state, showing that the styles are somewhat densely hairy, but not in a broad woolly head like those of *R. coriifolia*. A specimen cultivated at Kew by Mr. Baker has quite thinly hispid styles, and very small but broadly ovoid fruit.

It seems to be a frequent plant on the Continent, and the very broad glandular-dentate sepal pinnæ of the type are well represented in most of Déséglise's specimens. This characteristic is the only one I can see which justifies Crépin's opinion that it should be classified with *R. tomentella*.

No opinion as to which of my groups *R. canescens* should fall into can be deduced from Déséglise's *Catalogue Raisonné*, because his subsection *Pubescentes*, in which it is placed, includes both *R. dumetorum* and *R. coriifolia*, from both of which he at once separates *R. canescens* by its biserrate leaflets. Boullu, however, said that Déséglise told him that he considered it to be synonymous with *R. hemitricha* Rip., an opinion with which Boullu did not concur, pointing out that the type of that species has globose fruit, but that he had named a variety of it *Beugesiaca*, which has ovoid fruit, and which he considers to be the same as *R. canescens* Baker.

Rosa hemitricha

Ripart ex Déséglise, Catalogue Raisonné, p. 204 (1877).

"General characters of *R. urbica* Lém., from which it differs in its villous and glandular petioles, and its doubly dentate leaflets."

I should hardly have considered this species worth including but for the fact that it is given full specific rank on the Continent, where it appears to be fairly frequent, also that there are four British specimens in herb. Déséglise. I have not seen an example named by Ripart, and those named by other collectors vary considerably in the degree of hairiness of the under surface of the leaflets, some being hairy all over, and some nearly glabrous, even on the veins. They are all more or less biserrate, usually having one secondary tooth on the back of each primary one, but occasionally they are quite glandular-biserrate. The petioles are, as a rule, decidedly glandular, those of *R. urbica* being rarely at all so.

Of the four British examples, three were collected by Briggs in South Devon. A specimen from Saltash Passage, labelled "*R. urbica*, but with petioles too setose, and leaflets somewhat doubly serrate," has small leaflets, acute at each end, doubly but not compoundly serrate, hairy on midribs, but only thinly so on side nerves. The petioles are pubescent and a good deal glandular, and bear a considerable number of small but stout hooked prickles. The styles are hispid, but the fruit is not formed. A Blackpool specimen has prickles like those of *R. tomentella*, leaflets rather large, rounded at base, glandular-biserrate, thinly hairy on midrib and nerves, petioles glandular and thinly pubescent. Styles hispid, but no fruit as in the last. A specimen from between Wiverton and Blackpool was labelled *R. arvatica* Pug. by Briggs, but the leaflets are eglandular beneath, even on midribs, though the petioles are glandular. The midrib, nerves, and petioles are villous. The prickles are straightish from large roundish bases. The fruit is small and subglobose, but looks abortive; styles hispid. The fourth specimen was collected by Mr. Baker at Bonington, Lanarkshire, and unnamed by him. It is unarmed. The leaflets are oval or obovate, of medium size, glandular-biserrate, villous on midrib and nerves. The petioles are pubescent and glandular. The fruit is not formed, but the young calyx-tube is very elongate. Styles very hairy.

Foreign Species of Subgroup III.

Besides some of the varieties classified under *R. Borreri* Woods and *R. coriifolia* Fries, of which some individuals might be mistaken for the present subgroup, I only know of two foreign species likely to occur in Britain, viz., *R. amblyphylla* Rip. and *R. Guepini* Desv. Neither appears to be at all common on the Continent, and both are treated by Déséglise as subspecies of *R. canescens* Baker.

R. amblyphylla Rip. has leaflets shaped like those of *R. obtusifolia* Desv., very hairy both sides but biserrate, flowers white or nearly so, and styles glabrous.

R. Guepini Desv. is more like a biserrate *R. collina* Jacq., with leaflets broadish, not always large, glabrous above and thinly hairy beneath. Peduncles glabrous. Fruit large, subglobose, in a cluster.

Subgroup iv. Leaflets biserrate. Peduncles hispid-glandular or hairy.

Key to British Species.

Of medium height, compact. Leaflets small, grey-green, very glaucous. Peduncles mostly solitary ..... *R. cæsia* Sm.

Tall, elongate. Leaflets rather large, green. Peduncles in clusters *R. Lucandiana* Déségl. & Gill.

Rosa cæsia

Smith, English Botany, tab. 2367 (1811).

"Fruit roundish-ovate, smooth. Prickles of stem hooked. Leaflets ovate, pointed, doubly serrated, downy; very glaucous, as well as the germen and young branches."

In *English Flora*, ii. p. 390 (1824), Smith gives the following fuller description :—"A compact bush, 4–5 feet high, very glaucous on foliage, young branches, and calyx. Stem and branches purplish brown, smooth. Prickles light brown, in pairs, with oblong, elliptical bases longer than themselves. Leaflets 5–7, elliptical, acute, teeth sometimes slightly notched and glandular as well as unequal, but not very regularly nor distinctly double; upper side glaucous, smooth, rarely downy; under side hairy, especially about midrib and veins. Petioles downy and somewhat glandular, scarcely prickly. Stipules oblong, acute, pale, downy, gland-ciliate, the upper broader, and changing into ovate-pointed bracts. Peduncles solitary (or sometimes in pairs), smooth, naked, shorter than bracts. Flowers of uniform beautiful carnation hue, occasionally white. Calyx-tube ellipsoid, naked, very glaucous, subsequently brownish. Sepals smooth or glandular on back, one of them pinnate with few narrow, distant, sometimes slightly glandular pinnæ. Styles prominent, very hairy. Sepals deciduous. Fruit ellipsoid."

The original specimen from which the above description was made is in the British collection of the National Herbarium. It was collected by Borrer at Taymilt, Argyleshire, and is the end of a stem with four or five short flowering-branches on it. Its prickles are on very long bases, slender, a good deal curved or even hooked, more or less in pairs. The leaflets are small and close set, elliptical, acute, not acuminate, narrowed below, grey and glabrous above, at least when mature, hairy all over beneath but not densely so, with prominent veins. The toothing is fine and close, and only slightly double, some teeth being simple and eglandular, but the majority bearing one somewhat glandular denticle, rarely two or three. The petioles are densely pubescent or felted, quite unarmed, and very little glandular. Stipules quite hairy on back. Peduncles short, only very slightly hispid-glandular. Sepals somewhat glandular on back and edges, long and narrow, with few narrow simple pinnæ, reflexed. The fruit is not formed. Styles in a broad head, densely hairy, much as in *R. coriifolia* Fr.

It will be noticed that Smith credits his plant with smooth peduncles, but Borrer describes them as "naked or sparingly setose," which agrees with his specimen and other authentic ones from the same neighbourhood. Mr. Baker, in his Review, says they are "rather closely aciculate and setose," which is not the case.

R. cæsia Sm. appears to be a rare and local species, being found in Argyle and Perth. It is reported from various other

counties and from the Continent, but specimens I have seen do not in the least agree with the original or with its description, even making due allowance for local variation. Its small size, grey glaucous hue, the shape, clothing, and dentition of its leaflets, its very slightly hispid peduncles, and its very hairy styles, mark it well. It is near *R. canescens* Baker, but that has uniserrate leaflets and smooth peduncles. It is also near *R. cæsia* var. *incana* Woods, which certainly belongs to the *R. coriifolia* group by its densely woolly styles and erect sepals. Crépin thought that *R. cæsia* Sm. should be placed under *R. coriifolia* Fr., an opinion to which I strongly incline, but I think its reflexed sepals and somewhat less woolly styles (in some authentic specimens they are only hispid) are sufficient to justify its retention under *R. dumetorum*.

Rosa lucandiana

Déséglise & Gillot in Observations sur plusieurs Rosiers de la Flore Francaise (Bull. Soc. Roy. de bot. Belg. xix. 1880).

"Tall. Branches flexuose, elongate, with *scattered prickles or unarmed*. Prickles on main stem robust, dilated at base, curved or hooked, whitish. Branches *unarmed, or with rare* red curved opposite prickles. Petioles villous or thinly so, scattered glandular and prickly. Leaflets 5 to 7, green, *glabrous* above, pale and villous on midrib and nerves beneath, terminal *oval-acute or subacute*, rounded or a little narrowed at base, the lateral more obtuse, doubly dentate, with mucronate glandular and ciliate teeth. Stipules on old branches narrow, on young rather broader, glabrous, usually cuspidate, glandular-ciliate. Auricles straight or diverging. Peduncles 1 to 5, *glabrous, scattered hairy, or glandular* in the same cluster. Bracts more or less broad, often foliaceous, glabrous, glandular-ciliate, longer than peduncles. Calyx-tube *ovoid or globose, constricted at the top*, glabrous. Sepals appendiculate, glabrous, appendages lanceolate, denticulate, salient in bud, shorter than corolla, *reflexed but persistent.* Styles short, hispid. Disc flat. Corolla light rose, petals emarginate. Fruit red, ovoid or pyriform."

This is a rare species, apparently founded on a British example collected by Briggs at Blackpool, Devon. His specimen in herb. Déséglise, which I presume is the type, has fairly numerous curved, not hooked, conical prickles. The leaflets are of medium to rather large size, rather broadly oval, somewhat rounded at base, moderately strongly glandular-biserrate. They are glabrous above, hairy on nerves beneath, and glandular on the midrib. The petioles are shortly but rather densely pubescent, and a good deal glandular, but variable in this respect. The flowers are three to six in a cluster, some peduncles glandular-hispid, some not, but they are short and partly hidden by bracts. The sepals are gland-ciliate, but not glandular on backs. Styles villous. Fruit too young to determine its shape. A specimen from Doncaster, collected by Mr. Webster, has nearly unarmed branches, leaflets medium or small, ovate, much rounded at base, slightly hairy

above, densely so beneath, not at all strongly biserrate, and teeth not glandular. The petioles are densely pubescent and a good deal glandular. The peduncles and whole fruit are hispid-glandular. The fruit is very small and subglobose. The sepals have fallen. Styles villous, rather long.

There are only two foreign specimens, both named with doubt, notes from which would therefore be misleading. Like the last, this species shows considerable approach to the *R. coriifolia* group.

Foreign Species of Subgroup IV.

I know of no foreign species of this subgroup which are likely to occur in Britain, but, as with the last, occasional examples of the *R. Borreri* and *R. coriifolia* groups might be supposed to belong here. *R. arcana* Déségl. and *R. incerta* Déségl. (see subgroup ii.) sometimes have their leaflets sufficiently biserrate to be associated with this subgroup.

GROUP OF ROSA GLAUCA.

This being a smaller group than the last two need be divided into two subgroups only, *viz.* those with uniserrate and those with biserrate leaflets.

Subgroup i. Leaflets uniserrate.

Key to British Species.

1	Peduncles smooth	2
	Peduncles glandular	*R. Reuteri* var. *transiens* Gren.
2	Sepals erect	3
	Sepals reflexed or spreading	*R. Reuteri* var. *subcanina* Christ.
3	Leaflets oval, often subobtuse. Petioles glabrous. Sepals erect but deciduous before fruit ripens	*R. Reuteri* God.
	Leaflets elliptical, acute. Petioles often hairy. Sepals very erect and persistent	*R. Crepiniana* Déségl.

I have adopted *R. glauca* Vill. as the oldest name for this group, its description having been given by Loiseleur-Deslongchamps in Desvaux *Journ. Botanique*, ii. p. 336 (1809), as follows:—"Ovate fruit and peduncles eglandular. Sepals pinnatifid. Leaflets oval, glaucous. Prickles scattered." This is quite insufficient to identify it, and I have not seen any authentic specimens. I have, therefore, treated *R. Reuteri* God. as a segregate, rather than as a synonym, as most authors regard it.

Rosa Reuteri

Godet ex Reuter, Catalogue des plantes vasculaires de Genève, p. 68 (1861).

"4 ft. to 5 ft. Leaves glaucous, reddish on nerves and young shoots. Leaflets 5 to 7, oval or obovate, often obtuse, teeth

usually simple. Stipules large, foliaceous. Flowers 2 to 3. Peduncles glabrous, rarely glandular, scarcely longer than calyx-tube. Sepals reflexed after flowering, pinnatifid, with entire appendages. Petals large, longer than sepals, overlapping at edge. Fruit large, subglobose or ovoid, orange-red. Sepals erect, falling as fruit commences to ripen. Differs from *R. canina* in its more glaucous, more obtuse, often obovate leaflets. Flowers more shortly peduncled. Fruit large, pruinose, ripe early, with sepals not falling till it begins to ripen."

Déséglise's description (Ess. Monog. p. 99) is almost identical, but he adds that the prickles are inclined or straight, petioles glabrous, unarmed or nearly so, leaflets firm, coriaceous, oval or obtuse, stipules large with dilated auricles, styles villous.

As a rule this species is tolerably well marked. Its shoots, stipules, and bracts are very frequently red, its leaflets glaucous, stipules broad and almost always remarkably dilated upwards. Its peduncles are short, though not so short as in some of the varieties of *R. canina*. Its styles are very woolly, in a broad sub-hemispherical head, and its sepals almost always rise as the fruit reddens, though they are less persistent than in *R. Crepiniana*. The shape and dentition of the leaflets varies somewhat. They are usually oval and subobtuse, or, if acute, are not acuminate nor long-pointed. Their teeth are usually narrow, deep, and much directed forward, but not unfrequently they are coarse. The petals are usually deeper in colour than in most of the *R. canina* group.

There are a large number of specimens in Déséglise's herbarium, many of them labelled by rhodologists of repute as *R. glaucescens* Desv., *R. globularis* Franch., *R. sphærica* Gren., and *R. dumalis* Bechst., though I think Déséglise was correct in referring them all to the present species.

There are only two British examples in his herbarium. One, collected by Mr. Baker, without locality, which is quite typical, except that its peduncles are rather longer than usual. The other, by Webb, from Sephton, Lancs, seems to be off type in its dark green, almost biserrate leaflets, with somewhat hairy and slightly glandular petioles; its stem and branches also are much more prickly than usual. The styles, however, are in the characteristic villous head of the group.

Rosa Crepiniana

Déséglise ex Baker, Review of British Roses, p. 28 (1864).

"Habit and growth of the normal plant. Leaflets somewhat glaucous green, especially beneath, glabrous both sides, serrations large, simple, pointing forward; terminal ovate or elliptic, usually narrowed at base. Petioles prickly, but hardly at all setose, not at all or but slightly hairy. Stipules and bracts glabrous on back, hardly at all setose-ciliate. Peduncles naked, short, often hidden by stipules and bracts. Calyx-tube and fruit naked, sub-

globose, rather glaucous. Sepals naked on back, leaf-pointed and copiously pinnate, hardly at all glandular-ciliate, erecto-patent after petals fall. Fruit turning scarlet early in September, and most of the sepals adhering till it is fully ripe. Styles densely villous."

Déséglise also quotes Dumortier's description in his *Monog. des roses de la flore Belge*, p. 62 (1867), as referring to this species. Dumortier says:—"This curious species forms low tufted bushes. Stems furnished with hooked prickles. Shoots, young leaves, and stipules reddish. Branches furnished at base with three close scales. Petioles with prickles and some glandular acicles, otherwise glabrous. Leaflets oval, pointed, simply dentate, with some stipitate glands on midrib, quite glabrous. Bracts subscarious, small, glabrous. Peduncles, fruit, and sepals glabrous. Flowers solitary, of the form and colour of *R. pimpinellifolia*. Fruit oval, blackish, crowned by inarticulate erect sepals." It will be seen that this description differs from Mr. Baker's in habit and in colour of fruit. The habit no doubt varies according to the situation, and the colour of the fruit of *R. Crepiniana* is said to be *blood*-red as compared with the *orange*-red of that of *R. Reuteri*, so that if Dumortier had only seen very late fruits, they might have appeared blackish. He evidently shared the view of some foreign botanists in attributing rose-coloured flowers to *R. pimpinellifolia* Linn., those plants with white flowers being referred to *R. spinosissima* Linn.

Mr. Baker, in his Monograph, reduces this species to a synonym of *R. Reuteri* God. and *R. glauca* Vill., neither of which are mentioned in the Review, nor does Dumortier notice them, so that the differences between *R. Crepiniana* and *R. Reuteri* or *R. glauca* are not brought out by those authors. Déséglise, in the key in his *Catalogue Raisonné*, p. 121, contrasts them as follows:—

Leaflets oval, or oval-obtuse, glaucous, with nerves somewhat reddish; flowers bright rose; fruit large, orange-red, subglobose or ovoid . .	*glauca.*
Leaflets oval; fruit ovoid, blood-red, crowned by persistent sepals	*Crepiniana.*

The differences, therefore, do not appear to be great, but lie chiefly in the more persistent sepals of *R. Crepiniana*, and its more ovoid, deeper red fruit. The petioles are sometimes slightly hairy, and usually, as well as the midribs, somewhat glandular.

There are five British specimens in herb. Déséglise. They all have the broad stipules and auricles of *R. Reuteri*, but their leaflets are more elliptical and acute, the fruit more ellipsoid, and the sepals very erect and persistent. The styles are in a villous head. There are only two foreign specimens. One a very doubtfully named one from France, and one from Belgium, so that the species is essentially a British one.

Rosa Reuteri var. subcanina.

Christ in Rosen der Schweiz, p. 169 (1873).

"Differs from the type in its reflexed sepals, and thinly pubescent petioles and nerves beneath leaves, also in somewhat longer peduncles."

Christ adds to this very brief diagnosis the remark that it connects *R. Reuteri* with *R. canina*, differing from the latter in its larger leaflets, larger and earlier fruit on shorter peduncles, broad bracts, light rose flowers, and large white woolly head of styles. These additional remarks should serve to diagnose the variety; but the author's mention of hairy nerves is not quite intelligible, as they are not permissible in any form of *R. Reuteri*, nor are they to be seen in any of Christ's own specimens.

I have seen three examples named by Christ, none of them being British. One in Déséglise's herbarium is placed in his cover of *R. glauca*, as apparently he did not recognize Christ's variety. It is only the end of a flowering-branch, so the prickle characters cannot be seen. The leaflets are rather long and narrow, almost lanceolate-ovate and acuminate, very coarsely simply serrate. The petioles are quite glabrous and eglandular, with one or two small prickles. Stipules narrow, not at all ciliate. Peduncles not very short. Sepals long, spreading, not much pinnate. Fruit small, ovoid. Styles in a very hispid, almost woolly head. The other two specimens are at Kew. One from Valais has medium-sized, elliptical, long-pointed leaflets, rounded or slightly narrowed at the base. Petioles mostly quite glabrous and eglandular, occasionally very slightly hairy. Some stipules quite normal, some dilated. Peduncles 1–3, short. Fruit subglobose. Some sepals reflexed, some erect. Styles in a rather woolly head. Christ's specimen from Thuringen has few small prickles, those on petioles being strong and curved. The leaflets are medium to rather large, broadly oval, subobtuse, shallowly simply serrate; petioles finely pubescent. Stipules rather broad. Peduncles very short. Fruit large and globose, in clusters of three to four, the central ones subsessile and narrowed below. The styles are a good deal hispid, but not woolly. The sepals have all fallen, the fruit being well advanced towards maturity. This specimen does not resemble *R. Reuteri* as do the other two.

This variety has been regarded in Britain as synonymous with *R. Crepiniana*, which certainly is not the case. There appears also to be a tendency to place all specimens of *R. canina* with rising sepals to this variety, whereas its leading characteristics are those of *R. Reuteri*, from which it differs primarily in its reflexed or not more than spreading sepals, and, to judge from specimens, in its denser habit and smaller foliage.

Rosa intricata

Grenier in Revue de la Fl. des Mts. Jura, p. 64 (1875).

"Fruit globular. Peduncles more or less hispid-glandular, also fruit. Leaflets with simple teeth."

Grenier first described this species (as he also did *complicata* and *fugax*) as a variety of *R. Reuteri*, viz., var. *transiens* in his *Fl. de la chaine Juras*. p. 239 (1864), quoting the species name as a synonym, but as the latter names are those the species in question are best known by on the Continent, I retain them in preference to the earlier varietal names, without prejudice to the question of whether they should be regarded as species or varieties. Grenier's earlier description is equally brief, *viz.*:—"Petioles little or not glandular. Leaflets with simple, eglandular teeth. Peduncles with some glandular setæ, also fruit."

This species differs in no important respect from *R. Reuteri*, except in its glandular peduncles. The glandular setæ are often quite few, and in the specimens I have seen, usually do not reach the fruit.

There are about a dozen sheets in herb. Déséglise, most of which agree with *R. Reuteri* in their red stipules, dilated auricles, very glabrous petioles, and large fruit, which may be either globose or ellipsoid, with large head of woolly styles. None of these specimens are British, but I include the species, as it has been satisfactorily identified from Britain.

Foreign Species of Subgroup I.

I am unable to give a list of foreign species belonging to this and to the next subgroup as being likely to be found in Britain, as I have done in those of *R. canina* and *R. dumetorum*. The whole group appears to be represented only in the mountain regions of France, Switzerland, and Belgium, or further afield, so there is no more reason to suppose from their distribution that one species more than another should be found in our islands, whereas to mention the whole of the individuals described on the Continent would occupy too much space. The group, at least in Central Europe, appears to be a large one.

Subgroup ii. Leaflets biserrate.

Key to British Species.

1 { Peduncles glandular-hispid ..... *R. fugax* Gren.
  { Peduncles smooth 2

2 { Prickles running into acicles. Leaflets not fully biserrate *R. Hailstoni* Baker.
  { Prickles uniform. Leaflets fully biserrate 3

3 { Petioles glabrous. Midribs slightly glandular. Sepals falling before fruit ripens ..... *R. complicata* Gren.
  { Petioles somewhat hairy. Sepals persistent till fruit ripens *R. subcristata* Baker.

Rosa fugax

Grenier, Revue de la Fl. des Mts. Jura, p. 64 (1875).

"Fruit globular. Peduncles glandular. Leaflets with denticulated teeth."

Grenier formerly described this as a variety, *adenophora*, of *R. Reuteri* as follows:—"Petioles glandular. Leaflets doubly glandular-dentate. Fruit and peduncles with some glandular setæ." (See remarks under *R. intricata* Gren., p. 93.)

Authentic specimens of this species present all the leading characteristics of *R. Reuteri*, viz. broad stipules and auricles, reddish colouring (not always present), densely woolly styles, and erect persistent sepals, but the leaflets are biserrate, and the petioles and peduncles glandular-hispid, sometimes only slightly so, but sometimes reaching to the top of the fruit. The fruit is much more often of an ellipsoid than a subglobose form, and the sepals are more glandular on the back than in the other varieties, though Déséglise (Cat. Rais. p. 122) says they are smooth.

There are two British examples in herb. Déséglise. One from Messrs. Groves, collected by Brotherston at Newtonden, Berwick, and unnamed by them, has a strong *Reuteri* look about it. It has very large elliptical biserrate leaflets, rather small ellipsoid fruit on short glandular-setose peduncles, glandular-setose sepals, and woolly styles. Webb's specimen from the Menai Straits, labelled by him "*R. Reuteri* with glandular peduncles," looks quite different, and does not present the leading features of *Reuteri*, although the naming has been accepted by Déséglise. The leaflets are not much biserrate, the stipules neither broad nor red, the peduncles abnormally long, sepals not much erect, and the styles are subglabrous, not in a head.

Rosa subcristata

Baker in Review of British Roses, p. 29 (1864).

"Habit and prickles of normal plant. Leaves somewhat glaucous-green above, more so beneath, glabrous both sides, serrations somewhat open, and each with one or two accessory gland-tipped teeth, the terminal leaflet elliptical or ovate, a little rounded at the base. Petioles prickly and a little hairy, and rather copiously setose-ciliated. Stipules and bracts naked on the backs, but setose-ciliated. Peduncles naked. Calyx-tube and fruit ovate-urceolate or subglobose. Sepals somewhat tomentose towards edges, and more or less gland-ciliate. Fruit ripening early September, and most of the sepals adhering till it is fully ripe. Styles villous."

Mr. Baker's type appears to be his No. 23. This has leaflets not strongly biserrate, which agrees with his description. The petioles are only slightly glandular and thinly villous, and fruit quite ellipsoid, sepals erect, and styles densely villous. Other specimens named by Mr. Baker and by other British botanists

have glabrous or all but glabrous and often eglandular petioles, while the fruit varies from quite ellipsoid to subglobose; the midrib of the leaflets is rarely slightly glandular.

This species is obviously very near *R. complicata* Gren., and Mr. Baker regards them as synonymous. Déséglise, however, keeps them in his key (Cat. Rais. p. 122) as separate species, distinguishing them by attributing to *R. subcristata*, "petioles puberulent-glandular; fruit globose, crowned by persistent sepals"; and to *R. complicata*, "petioles glabrous, glandular. Midrib of leaflets with some glands. Fruit ovoid. Sepals persistent till coloration of fruit." These differences, even on paper, are only slight, and break down when applied to specimens. Déséglise does not appear to have been well acquainted with Mr. Baker's species, which is unknown on the Continent, and has under this name plants which have been sent to him unnamed by Mr. Baker with hairy leaflets and glandular peduncles, which are quite inadmissible. The value of his opinion is therefore much discounted; but as he regarded the two as different, and my present object being rather to describe what has been recorded than to break down species, I keep both up till I am more familiar with them.

Mr. Baker quotes Woods's *R. tomentosa* var. γ, No. 41 of his herbarium, as synonymous with his *subcristata*. The specimen was gathered by Borrer at Loch Tay, and is a very peculiar one. It has very slender, straight, subulate prickles like those of *R. mollis*. Its leaflets have the form and serration of *R. tomentosa*, but are quite glabrous on both sides, some are glandular on the midrib, and some not. Its petioles are glabrous, but densely glandular. The peduncles are all almost covered by their bracts, but appear to be smooth, though Mr. Baker says some of them are a little aciculate. The calyx-tube is subglobose, the sepals spreading-erect, with foliaceous appendages and pinnæ, and are very hispid-glandular on the back. The styles cannot be seen. In spite of the glabrous leaflets and eglandular or almost eglandular peduncles, I think this plant is allied to *R. tomentosa* rather than to *R. Reuteri*.

Rosa complicata

Grenier in Revue de la Fl. des Mts. Jura, p. 64 (1875).

"Fruit globular. Peduncles naked. Leaflets with denticulated teeth."

As before mentioned (see p. 93), Grenier described this in 1864 as *R. Reuteri* var. *intermedia*, thus:—"Petioles glandular; teeth double, glandular; peduncles naked."

This short description of course covers *R. subcristata* Baker, and, as stated under that species, the two are very likely synonymous.

A specimen in herb. Déséglise, collected and named by Grenier, has declining straight or curved, rather large, but not very strong prickles. Petioles glabrous, and only very slightly glandular.

Leaflets of medium size, oval, subobtuse, fully but shallowly biserrate, not glandular on edges nor midrib. Stipules rather broad. Peduncles of average length, smooth. Sepals little pinnate, eglandular, spreading, not erect. Fruit subglobose-urceolate. Styles densely woolly.

Déséglise has two British examples, collected but not named by Mr. Baker. They are labelled *R. inclinata* Kern, and are in the *R. complicata* Gren. cover, the names being synonymous. They are from Seaton Delaval, in Northumberland, and Swaledale, Yorkshire, and Mr. Baker's own notes on them show them to differ from his *subcristata* mainly in their deep red flowers and more glandular sepals.

Rosa Hailstoni

Baker in Report of Bot. Exch. Club, p. 7 (1867).

"Habit and growth of *canina*. Prickles moderately close and numerous, the large ones like *canina*, but running into small, slender aciculi. Leaves bright green and naked above, paler and quite naked beneath. Terminal ovate, rounded at base. Serrations open and rather irregular, a few teeth slightly double. Petioles not at all hairy, but slightly setose, with 3-4 falcate acicles. Stipules naked on back, closely setose-ciliated. Peduncles 3–4, rather short, quite naked. Calyx-tube obovoid or roundish, quite naked. Sepals fully pinnate and leaf-pointed, erect-patent after pale pink petals fall, naked on back, slightly hairy towards edges, slightly setose-ciliate, falling by the time the fruit ripens, which is in late September. Styles hairy. Recedes towards *R. hibernica*."

I have not seen Mr. Baker's type, but his No. 351, from Thirsk, in the British collection has prickles as he describes them on the barren shoot, but the shoot has had an injury while it was growing, causing it to assume a monstrous growth, which may account for the abnormality in the armature. The barren shoot beyond the injury, and the flowering-shoots, do not show any acicles. The leaflets are elliptical, almost biserrate. The styles and stipules are not those of the *glauca* group, and the sepals are spreading at right angles, not erect. The only fruit is ovoid.

Déséglise, though he does not mention this plant in Cat. Rais., has six specimens in his herbarium, three of which were named by their collectors *R. squarrosa* Rau, which belongs to my subgroup ii of *R. canina*, in which group Crépin places *R. Hailstoni*, probably correctly. None of these six have mixed armature on the flowering-shoots, and not all have acicles on the barren stems. All have very straight prickles, whereas Baker's description says the larger ones are like those of *canina*, i. e. hooked, and the only specimen I have seen of his agrees.

I have hardly seen enough authentic material to decide whether this species belongs to the group *R. glauca*, with which Mr. Baker places it, or *R. canina*, as Crépin has it, or whether it is merely a monstrosity. I do not think it belongs to the *R. hibernica* group, and see no resemblance in it to *R. Schultzii* Rip.

GROUP OF ROSA CORIIFOLIA.

The characteristics of this group are less well defined than those of the *R. glauca* group, with which, however, it has some points in common, especially its large woolly head of styles. Its sepals also are usually, but not always, persistent and erect, but the leaflets are not as a rule widely spaced nor large, and they are always hairy, even if only thinly so on the midribs beneath. The stipules are not so conspicuously large and broad. Its affinities therefore run into the *R. dumetorum* and *R. Borreri* groups, in which some of the varieties might equally well be placed.

I have found it a somewhat troublesome group to deal with. Its British representatives, with the exception of those of subgroup i., are not found on the Continent; I am unable, therefore, to determine their limits as compared with their foreign allies, not having been able to obtain any help from Déséglise's herbarium as in the other groups, except in so far as the British specimens contained therein are concerned. Specimens in the British herbarium show such great variation that little assistance is to be derived from their study, unless it be to show how variable and complex a group it is.

For these reasons the group does not readily lend itself to subdivision, the characteristics on which any subgroup might be formed showing much inconstancy. The least variable character is perhaps the leaf-toothing, which I have taken as the basis of the two subgroups I have adopted.

Subgroup i. Leaflets uniserrate.

KEY TO BRITISH SPECIES.

1 { Leaflets hairy above, and usually densely so beneath *R. coriifolia* Fr.
  { Leaflets glabrous above 2

2 { Fruit ovoid. Leaflets hairy only on midrib beneath, occasionally glabrous ..... *R. implexa* Gren.
  { Fruit subglobose. Leaflets hairy all over beneath *R. coriifolia* var. *subcollina* Christ.

ROSA CORIIFOLIA

Fries in Novitiæ Floræ Suecicæ, ed. 1, p. 33 (1814).

"Subglobose fruit and peduncles glabrous. Styles very short. Prickles recurved. Leaves ovate, coriaceous, pubescent beneath. Shrub, 4–6 ft. or more, suberect or horizontal, branched, prickly. Prickles recurved, whitish or purplish. Leaflets 5–9, ovate, coriaceous, very shortly petioluled, green, paler beneath, flat, subobtuse, unequally serrate. Petioles villous, spinose. Peduncles solitary, or often umbellate, glabrous, longer than the globose or ovoid-globose glabrous fruit. Sepals longer than the petals, otherwise as in *R. canina*, edges and inside villous, three pinnate,

two entire. Petals red. Styles very short. Fruit hard, red, globose, ovoid-globose, or even ovoid on same bush."

In *op. cit.*, ed. 2, p. 147 (1828), Fries writes :—" Opaque, lax, branches patent, flexuous, vegetation early. Prickles firm, compressed, uncinate. Petioles tomentose, subunarmed. Leaves scentless, coriaceous, elliptical, more or less obtuse, the younger adpressed-pilose above, at length glabrous, villous beneath, very entire at base, the terminal subcordate. Teeth simple, eglandular, sometimes spreading, sometimes adpressed. Peduncles 1–3, very short, always glabrous. Bracts conspicuous, ovate-lanceolate, longer than the fruit. Calyx-tube very subglobose. Sepals semipinnate, persistent, pinnules entire. Fruit subglobose, of the size of a nut, bright red a month earlier than *R. dumetorum*."

R. coriifolia Fr., like other species whose names are used in an aggregate as well as in a segregate sense, is surrounded by a large synonymy, which it is not the purpose of this paper to discuss. I may mention, however, that *R. bractescens* Woods (excluding var. β) and *R. frutetorum* Bess. are probably synonyms. Some authors regard *R. solstitialis* Bess. as a synonym, but Déséglise doubts this. He has seen a specimen collected by Besser in herb. DC., and no doubt has noticed other points of difference than the ovoid fruit, which is the principal one in the author's description. It does not seem probable, moreover, that at that time (before 1820) the same author would have described, as different species, two which afterwards proved to be synonymous. If, however, the synonymy be established, *R. solstitialis* Bess. must take precedence of *R. coriifolia* Fr., which it antedates by five years.

Some authors regard *R. coriifolia* as a hairy-leaved variety of *R. glauca*, with which it has in common erect persistent sepals, a broad flat head of very woolly styles, short peduncles, and usually broad stipules. Others regard it as a variety of *dumetorum*, to which some of its forms make a near approach, but the modern tendency, and to my mind the correct view, is to regard it as one of the cardinal species of the *Eu-caninæ* group. It is a common plant, both on the Continent and in Britain, and, unlike *R. Reuteri*, is more generally distributed, instead of being partial to mountainous districts. Its leaflets vary greatly in shape and size, but, as a general rule, are close-set on the petioles, which, together with the rather short stems, give the plant a somewhat compact appearance, but examples may be met with habit and foliage as lax as those of *R. lutetiana*. Typically the leaflets are simply serrate, though Fries's description allows them to be unequally serrate, and Déséglise emphasizes the latter character as one of the points by which it can be distinguished from *R. dumetorum*. On the Continent, specimens with more or less biserrate leaflets are placed to var. *subbiserrata* Borb., which appears to differ in little if any other respect. Fries says that the leaflets become glabrous above with age. This is rarely the case in the specimens I have seen, though they are not by any means always densely hairy even beneath. The petioles are almost always densely,

though usually finely, pubescent, usually unarmed, and rarely at all glandular, thus resembling those of *R. dumetorum*. The stipules are pubescent on the back, and though broad, are not as a rule so broad nor have they such dilated auricles as in *R. Reuteri*. Its peduncles are typically very short, though sometimes quite as long as those of *R. dumetorum*. The fruit is generally subglobose, that of *R. dumetorum* being ovoid. The sepals of authentic specimens in herb. Déséglise do not by any means usually rise above the disc. Thus, out of thirty-four specimens presenting developed fruit, and named by competent botanists, only four have erect sepals, while sixteen have them quite reflexed, the remaining fourteen having them more or less spreading. The specimens at Kew, however, show the erect character of the sepals more constantly, but it is difficult to believe that the contributors to Déséglise's herbarium, and his own judgment, can have been so often at fault. The pinnæ are well developed and foliaceous, and are rarely gland-ciliate. The styles are almost always in a broad dense woolly head. This latter character, together with the rising sepals and bright rose flowers, forms a ready means of distinguishing it from *R. dumetorum*, but exceptions to all these characters occur.

Christ (Ros. der Schweiz, p. 189) sums up the points by which *R. coriifolia* can be distinguished from *R. dumetorum* as follows:—"*R. dumetorum* has leaflets roundish oval, rounded at base; toothing broad and rounded; pubescence dark, hairs scattered. Flowers blush. Peduncles longer than the non-foliaceous bracts. Sepals reflexed, falling early. Styles long, hairy or glabrous. *R. coriifolia* has leaflets oblong with narrowed base; toothing finer and narrow; pubescence dense, adpressed, felted. Flowers bright rose. Peduncles longer [*sic* ? shorter] than the usually foliaceous broad bracts. Sepals spreading or erect, longer persistent. Styles short, in a woolly head."

There are two specimens, collected by Fries, at Kew. Both have close-set, large, oval, subobtuse leaflets, with rounded or subcordate base, simply or irregularly serrate, grey, with close, dense, adpressed pubescence both sides. Petioles with short dense pubescence, slightly glandular, unarmed. Stipules broad. Peduncles very short. Sepals erect, with broad segments, slightly hairy and glandular on the back. Styles in a woolly head. Stem-prickles stout, hooked, with very long bases. Flowering-branches prickly.

There are five British specimens accepted by Déséglise in his herbarium. One, by Webb, from West Kirby, Cheshire, labelled *R. coriifolia*, has elliptical or obovate acute leaflets of medium size, shallowly acutely simply serrate, pubescent both sides. Petioles pubescent, unarmed. Peduncles very short. Fruit medium to small, urceolate. Sepals rising. Styles villous. Briggs's specimen from near Plymouth, labelled *R. frutetorum* Bess., has ovate acute leaflets, very coarsely almost simply serrate, very thinly hairy above, pubescent, but not densely so beneath. Petioles pubescent, unarmed. Peduncles short. There is no

fruit, and the styles appear to be villous, but not densely so. His specimen from Lynham, South Devon, similarly labelled, is very similar, but the leaflets are a good deal more hairy, and the styles only rather thinly hispid. Mr. Baker's *R. coriifolia* from Dunkeld has small, somewhat biserrate, densely pubescent leaflets; petioles unarmed; peduncles short, fruit quite ovoid, sepals reflexed, styles densely woolly. His Thirsk plant has leaflets of medium size, rather broadly ovate, subacute, thinly hairy above, not densely so beneath, coarsely simply serrate. Petioles pubescent, some of them prickly. Peduncles very short. Fruit large, subturbinate. Sepals rising. Styles not visible.

Rosa implexa

Grenier in Revue de la Fl. des Mts. Jura, p. 62 (1875).

"Leaves glabrous both sides, the midrib of the lower surface alone hairy. The rest as in *R. solstitialis* Bess."

Grenier previously described this (Fl. Jura, p. 238, 1864) as a variety *denudata* of *R. solstitialis* Bess., which latter is regarded by many authors as synonymous with *R. coriifolia* Fr., but it has ovoid, not subglobose fruit. Grenier there says of var. *denudata*: "Leaves glabrous both sides. Petioles tomentose. Peduncles naked." It will be noticed that he does not mention the hairy midribs.

As with some others of Grenier's species, an unsatisfactory feature is that specimens authenticated by him differ essentially from his description. Thus, of two specimens certified by him in herb. Déséglise, one has quite obviously biserrate leaflets; they are also pubescent and glandular on secondary nerves, and the styles are only thinly hispid. These characters combined seem to me incompatible with his description. The other specimen has uniserrate leaflets, but with midribs and petioles quite glabrous, peduncles longer than is usual in the group, and hispid styles. It may be a very glabrous form of his species.

Taking the specimens and descriptions as a whole, it is evident that *R. implexa* is just a subglabrous *coriifolia*, i. e., its leaflets are rather large, close-set, quite glabrous above, eglandular beneath, and hairy only on midribs, as well as often densely so on petioles. Peduncles short. Fruit rather large, ovoid, with erect persistent sepals, and a large woolly head of styles.

There is a sheet in herb. Déséglise, collected by Webb at Raby, Cheshire. Though he placed it in this cover, Déséglise has not written its name on it, in accordance with his almost universal custom, nor does he quote it in his Cat. Raison. Its leaflets being elongate and fully biserrate, there is, I think, much doubt as to whether it should be accepted as *implexa*, though it agrees in most other respects with that species, and Grenier himself has accepted specimens almost equally biserrate.

ROSA CORIIFOLIA var. SUBCOLLINA.

Christ in Rosen der Schweiz, p. 191 (1873).

"Plant greener, more glabrous, naked on the under surface, but plainly hairy on the nerves. Calyx-segments often quite reflexed. The resemblance to *R. trichoneura* Rip. is very near, and it is also like var. *subcanina*, but its leaflets narrowed at the base, and its almost sessile, large fruit mark it sufficiently clearly."

Christ adds that his variety is synonymous with *R. monticola* var. δ Rapin, which its author thus describes (Guide des Bot. de Vaud, p. 194):—"Habit and general characters of *R. canina*, but differing in shorter peduncles, deeper coloured flowers, and erect sepals, though falling before the fruit is ripe. Fruit roundish or a little ovoid, ripening earlier, and pulpy. Leaflets uniserrate, more or less ashy and hairy beneath. Peduncles usually smooth, rarely glandular.

Both Christ's and Rapin's descriptions allow a good deal of latitude to this variety, though it must be borne in mind that Christ described it as a variety of *coriifolia*. He does not mention glandular peduncles. Specimens vary greatly, and it is difficult to generalize from them. Déséglise does not recognize it as distinct from *coriifolia*, of which it may be regarded as a subglabrous variety, like *implexa*, but with the sepals less persistent.

I have seen three examples collected and named by Christ, two of which are in the *coriifolia* cover of Déséglise's herbarium, to which they are obviously allied. They agree very fairly well with Christ's description, but the peduncles are by no means remarkably short, and the sepals are spreading. The fruit is rather large and broadly ovoid. A specimen at Kew has loosely reflexed sepals, globose fruit on very short peduncles, but the styles are only hispid, not in a woolly head. I have seen no authenticated British specimens, but as the name has been used in former publications, I retain it, but suspect that it should include Grenier's *R. implexa*.

Subgroup ii. Leaflets biserrate.

KEY TO BRITISH SPECIES.

1	Fruit ovoid or oblong	2
	Fruit broadly ovoid-urceolate or subglobose	4
2	Sepals reflexed. Leaflets small, eglandular beneath	3
	Sepals erect and subpersistent. Leaflets glandular beneath on mid-rib and secondary nerves	*R. Bakeri* Déségl.
3	Fruit large, ellipsoid, subsessile. Leaflets narrowed at base, densely greyish-pubescent	*R. cæsia* var. *incana* Borrer.
	Fruit usually small, ovoid. Leaflets broad at base, often subcordate, glaucous-green, thinly pubescent	*R. pruinosa* Baker.
4	Sepals reflexed after flowering	*R. pruinosa* Baker.
	Sepals erect after flowering	5

5 { Leaflets hairy both sides, glandular on midrib and secondary nerves. *R. coriifolia* var. *Lintoni* Scheutz.
Leaflets glabrous or only slightly hairy above, rarely glandular beneath..... 6

6 { Leaflets somewhat hairy above, ovate or elliptical, acuminate. Petioles only slightly glandular..... *R. Watsoni* Baker.
Leaflets glabrous above, broadly ovate like those of *tomentella*. Petioles very glandular ..... *R. celerata* Baker.

I find considerable difficulty in separating the species of this subgroup. Descriptions are often meagre, and authentic specimens very few. The subgroup is not as a rule well represented on the Continent, so that little assistance can be derived therefrom. It seems to be best represented in the North of England and Scotland, and may contain some well-marked endemic species.

Rosa Watsoni

Baker in Review of British Roses, p. 29 (1864).

"Leaves glabrous on upper surface. Teeth sharper and closer than in *coriifolia*, not always simple, the accessory serrations gland-tipped, somewhat hairy beneath, the terminal ovate. Petioles villous, but hardly at all setose. Stipules and bracts nearly glabrous on backs, slightly setose-ciliate, not particularly large, nor hiding peduncles as in *coriifolia*. Peduncles and ovate-urceolate calyx-tube naked. Sepals leaf-pointed, erect-patent after fall of petals, fully pinnate, glandular all over back."

In the Monograph, p. 236, Mr. Baker modifies the above description, saying that the leaflets are *doubly* toothed, stipules and bracts *densely* gland-ciliated, and petioles *glandular-setose*. His specimens from the Vale of Lorton, Cumberland, which seem to be the best material available, have slender prickles, either straightish or quite hooked; leaflets medium to large, oval or broadly so, acute or subacute, rounded at base, densely but finely pubescent, also often micro-glandular above, more or less densely hairy beneath, and slightly glandular on midrib only, strongly biserrate, both sides of primary teeth bearing denticles, which are sometimes glandular, sometimes not; petioles densely finely pubescent, not or very little prickly, scarcely or moderately glandular; stipules and bracts glabrous on backs; peduncles very short, as often slightly hispid-glandular as not; sepals more or less glandular on backs, erect but not persistent; fruit large ovoid or subglobose; styles woolly. One of the specimens (from the same locality) and most of those by other collectors have smaller, more glabrous leaflets, smaller, more globose fruit, and smooth peduncles, but all have the densely woolly head of styles of the group.

Mr. Baker thinks his species synonymous with *R. cinerea* Rap., of which I have seen an authentic specimen at Kew. It is certainly very near *Watsoni*, but has very glandular petioles, leaflets more hairy both sides, and its peduncles are hispid-glandular. The slender, straight, or slightly curved prickles, shape and dentition of leaflets, eglandular beneath except on midrib,

short peduncles, erect glandular sepals, subglobose fruit and villous styles are very similar.

ROSA CELERATA

Baker in Review of British Roses, p. 31 (1864).

"Habit of growth and prickles of normal plant. Leaves flat, firm but thin in texture, full green, glabrous on upper surface, pale green and hairy on midrib and principal veins beneath, the serrations open and as broad as deep, each furnished with 2–3 fine gland-tipped teeth on each side; the terminal leaflet broadly ovate, much rounded at base, the petioles pubescent and setose and prickly. Stipules and bracts copiously setoso-ciliate, naked or nearly so on back. Peduncles naked. Calyx-tube and fruit subglobose, the latter turning scarlet early in September, the sepals erect-patent after the petals fall, leaf-pointed and copiously pinnate, somewhat tomentose towards edges, copiously setoso-ciliate, and mostly lasting until after the fruit changes colour. Styles hairy. Agrees with *tomentella* in shape of leaves, but differs in fruit."

I have seen very little material of this species. There is a scrap from Mr. Baker's herbarium at Kew, and therefore presumably accepted by him. It only bears one complete leaf, and one peduncle in fruit. The terminal leaflet is large, obovate, considerably narrowed at the base, glabrous above, hairy and glandular on midrib and principal veins beneath, toothing very compound. Petioles pubescent and glandular, hardly prickly. Peduncles naked. Fruit broadly ovoid. Sepals spreading, much glandular-ciliate, smooth on back. Styles densely hispid, though in a small head.

Through the kindness of Mr. Bailey, I have seen a specimen gathered between Hartington and Scalderditch, North-east Stafford, which though not authenticated by Mr. Baker, must certainly be this species. The foliage is just that of *tomentella*, while the sepals are suberect and the styles in a dense woolly head.

ROSA CORIIFOLIA var. LINTONI

Scheutz in Journal of Botany, 1888, p. 68.

"Leaflets pubescent, more or less glandular beneath, biserrate, teeth with 1 to 3 glandular denticles. Peduncles short, naked. Receptacles subglobose eglandular. Sepals erect-patent after flowering, eglandular on back. Differs from *Tomentellæ* in erect persistent sepals. Comes between *R. Borreri* and *R. Bakeri*, nearest the latter."

The specimen from which this description was, I believe, drawn up is at Kew. It was collected by Mr. Linton at Braemar. It has oval leaflets, some quite rounded at the apex, some cuspidate, quite hairy both sides, glandular on midrib and secondary nerves, as well as densely micro-glandular on surface beneath, fully biserrate. Petioles pubescent, very little glandular, not

prickly. Peduncles rather short. Sepals reflexed just after fall of petals (the fruit is not formed). Style is a dense woolly head. The branches, stipules and bracts are strongly tinged with red. Another specimen from the same place, gathered two years earlier, is probably the same. It was labelled "*marginata* × *mollissima*?" by Mr. Linton, and "near *Borreri*" by Mr. Baker. It has very little red colouring, slightly larger, more acuminate leaflets, equally micro-glandular beneath; slightly prickly petioles; very short peduncles; globose fruit with some sepals erect, some reflexed, glandular on back; styles in a woolly head.

Except in the shape of its leaflets and their somewhat greater hairiness, this seems to differ but little from *R. celerata*. The latter species is not described as having its leaflets glandular beneath, but they are so in the only authentic specimen I have seen, and if it has the leaflets of *R. tomentella*, as Mr. Baker says, I should expect to find them glandular beneath. I expect, therefore, that an examination of a larger series of specimens than I have seen might prove var. *Lintoni* and *R. celerata* to be synonymous.

Rosa Bakeri

Déséglise in Journal of Botany, 1864, p. 267.

"7 to 8 feet, arching, with short branches. Prickles uniform, dilated at base, compound, less robust than i*n canina*, $\frac{3}{8}$ in. long, recurved just below tips, the upper smaller with discoid bases, straightish, those on young shoots falcate. Petioles with short abundant villosity and scattered, fine, more or less abundant glands, *unarmed or with fine white prickles*. Leaflets five to seven, all petioluled, terminal elliptic, $1\frac{1}{4}$ in. by $\frac{7}{8}$ in., *oval or elliptic, often narrowed below middle and obovate, deep green*, rather rugose, adpressed hairy when young, *glabrous* when old, nerves beneath with adpressed villosity, *midrib and edges with few fine scattered glands*, deeply doubly dentate, teeth open, as broad as long, glandular-ciliate. Stipules lanceolate, glabrous above, pubescent and glandular on backs, with acute denticulate auricles, straight or a little diverging, ciliate and glandular on edges. Peduncles one to three, *very short*, hidden by stipules and bracts, smooth or with rare small abortive glands. Bracts ovate-cuspidate, glabrous above, lightly villous beneath, longer than peduncles. Two sepals entire, three pinnate, with foliaceous villous points and fine scattered glands except at base, appendages lanceolate, ciliate with fine glands, the lowest $\frac{3}{4}$ to 1 in. long, salient in bud, equalling the corolla, reflexed, then spreading at right angles and persistent till the fruit colours. Calyx-tube ovoid, glabrous. Styles free, short, *obscurely hispid or glabrous*. Flower $1\frac{1}{2}$ in., rose. Fruit medium ovoid or ellipsoid."

Baker in Review, p. 34, says:—"6-8 ft., scarcely at all arching, purple where exposed. Branches stiff and spreading, prickles more slender and less curved than usual. Leaves full-green and moderately firm, covered all over with a thin coating of soft silky hairs above, paler all over beneath with a scattering of

small green viscous glands, serrations open and many times toothed with gland-tipped teeth; terminal ovate or obovate, either rounded at base or narrowed from below middle. Petioles both prickly and rather pubescent, copiously setose. Stipules and bracts both hairy and somewhat glandular on back, copiously setoso-ciliate. Peduncles sometimes naked, sometimes with a few weak prickles and setæ, short and often hidden by bracts and stipules. Calyx-tube naked, oval or elliptical-urceolate. Petals deeper coloured and smaller than in type, and wavy towards borders. One or two sepals simple, the others copiously pinnate and leaf pointed, all slightly glandular on back, hairy towards edges and copiously setoso-ciliate, erect-patent after petals fall. Fruit ovate or elliptic, ripe early September, most of the sepals adhering till after it changes colour. Styles villous. Near *Borreri*, but leaves very different in shape and texture, and very slightly glandular beneath. Peduncles hardly at all aciculate, and sepals subpersistent."

In the Monograph, p. 237, Mr. Baker says this species approaches "*R. pulverulenta* M. Bieb." (i. e., *R. sepium* Thuill), his opinion being based no doubt on the glandular under surface of the leaflets, and the oblong or turbinate fruit. Déséglise contrasts it with *tomentella*, though there seems to be little danger of confounding it therewith. He also adds that it is very near *R. fœtida* Bast. (one of the *Tomentosæ*), but has no smell on rubbing, the leaves are less glandular, peduncles very short, glabrous, calyx-tube glabrous, sepals much less glandular, flowers rose, fruit bright red. I do not think Déséglise would have seen the similarity to *fœtida* had he not credited *R. Bakeri* with obscurely hispid or glabrous styles; and if we confine ourselves strictly to the description, the bulk of Mr. Baker's gatherings and those of others must be regarded as off type, as they almost all present the large woolly head of styles so characteristic of the *coriifolia* group. Mr. Baker's No. 30, however, which Déséglise quotes as a type, and one or two others, have the styles only moderately hispid. This being an endemic species, and since the bulk of the authentic specimens agree with Mr. Baker's description in having villous styles, it is, I think, justifiable to regard the example from which Déséglise drew up his description as untypical in this respect.

Judging from Mr. Baker's specimens collectively, *R. Bakeri* should have slender curved prickles from longish bases, leaflets of medium size, elliptical or oval, somewhat narrowed below, pubescent both sides, but very thinly so above and not densely beneath, glandular all over the lower surface in No. 30, but usually only on midrib and secondary nerves, or on midrib only; the primary teeth very coarse, much biserrate; petioles very densely but shortly felted, and with glandular setæ. Peduncles 2 or 3 together, very short, usually glabrous, but slightly glandular-hispid in No. 30. Fruit ovoid, usually towards ellipsoid, rarely subglobose. Sepals spreading-erect, persistent, fully bipinnate, strongly glandular-ciliate, but not much glandular on back. Style in a broad, more or less villous head.

Rosa pruinosa

Baker in Review of British Roses, p. 27 (1864).

"Stem less arching, and prickles more slender than in normal plant. Leaflets flat, glaucous-green above, and thinly hairy all over when young, glabrous when mature, still more glaucous and hairy all over beneath. Terminal broadly ovate, roundish or even cordate at base, serrations open and furnished with one or two glandular teeth each side. Petioles villous and copiously setose. Stipules and bracts hairy on back and setoso-ciliate. Peduncles naked. Calyx-tube and fruit subglobose like last [*dumetorum*] but sepals more setoso-ciliate. This is Mr. Robertson's *cæsia*, but differs considerably from Mr. Borrer's Argyleshire plant figured as *R. cæsia* Sm. in E. B."

In the Monograph, p. 230, Mr. Baker says this is like *dumetorum*, but very glaucous, the serrations laxer and compound, the secondary teeth gland-tipped, and petioles slightly glandular. Specimens I have seen seem to approach *canescens* and *incana*.

I have only seen one example collected or named by Mr. Baker, from Tynedale. It has rather slender prickles, quite small leaflets on flowering-shoots but large ones on barren stem, rounded or subcordate at the base, thinly pubescent but very grey above, densely pubescent beneath, toothing quite double. Petioles with very short glands. Peduncles quite of average length, with 2 or 3 glandular setæ. Fruit small, ovoid, sepals reflexed, glandular-setose on the back. Style in a dense woolly head.

There is little other material of this species. The combination of very grey-green, glaucous, fully biserrate leaflets, reflexed sepals, and woolly head of styles are its leading characteristics, but its leaflets are often narrow and close-set as in *cæsia*. Fruit usually not globose, and peduncles naked. I have not seen it recorded from the Continent, and it is not mentioned by Déséglise.

Rosa cæsia var. incana

Borrer, ex Hooker's British Flora, ed. 3, p. 242 (1835).

"8 ft. Leaves very glaucous and slightly downy above, densely so beneath, as are also petioles and backs of stipules, on which, as well as on edges of the serrations and of the calyx are sprinkled small glands, and a few are sometimes found on the veins beneath the leaves near point. Peduncles beset with soft hairs, not setæ. Calyx-segments bare on back, very woolly on edges, spreading widely or even recurved after flowering, and remaining till fruit is ripe; pinnæ broad and short. Fruit bluntly oblong, equally large at each end like an olive. Prickles strongly hooked, with remarkably elongate bases."

His description of *cæsia* is very similar to that of Smith, but he emphasises the "stigma is a round prominent mass." His var. *incana* differs from his type mainly in its persistent sepals which,

taken in conjunction with the woolly head of styles presented by specimens, places it certainly in the *coriifolia* group, with which indeed typical *R. cæsia* Sm. is closely allied.

I have seen no authentic material of this variety, which Déséglise considers to be synonymous with *R. canescens* Baker, though Mr. Baker considers this latter to be only a similar form with the fruit and sepals of the type, i. e., *canina*, while he quotes *R. tomentosa* o. *incana* Woods as a synonym. There is a poor specimen of the latter, No. 59, in Woods's herbarium, from Sabine's garden at North Mimms, which agrees generally with Borrer's var., but the important character of the styles cannot be seen, so I cannot be certain of its group. Its appearance, however, is not that of a *tomentosa*.

The only specimens available of Borrer's variety are those in the National Herbarium, all collected by Mr. Barclay. One of these, from Callerfountain Hill, Perth, has been named by Mr. Baker. It agrees well with the description, but the prickle-bases do not appear unusually elongate. The leaflets are rather small, narrow, and very close set, very thinly hairy above, finely but densely pubescent and eglandular beneath, just like those of *cæsia*, but they are fully biserrate. The petioles are densely pubescent and glandular, but not at all prickly. The fruit is remarkably large and oblong, on short, slightly hairy peduncles. The sepals are very long, reflexed, but persistent, glandular-ciliate, but glabrous on back. Styles in a dense woolly head.

This variety is one of the connecting links, through *R. cæsia* Sm., of the *coriifolia* and *dumetorum* groups.

Foreign Species of the Group Rosa coriifolia.

Beyond those already mentioned as probably synonymous with British species, I know of no foreign species which there is special reason to suppose may be found in Britain, though a considerable number are named.

Concluding Remarks.

I fear this paper has reached a considerably greater length than I at first intended, and perhaps if I had confined myself to collating and publishing authors' descriptions, it might have been equally useful. A distinguished botanist has said that the descriptions of individual roses are worth less than the paper they are written on, but I have given notes on a good many, partly to supplement the authors' descriptions, and partly to show what degree of variation is permissible. If, however, I had admitted every available specimen by authors of repute, it would have been obvious that the limits of the species were so wide that one would have been driven to adopt Crépin's plan in his later years of refraining from naming varieties at all, but referring them to groups only; indeed, it is by no means always easy to correctly diagnose the group a specimen belongs to.

It will be seen that I have made no new names; the only

originality I can claim is in one or two instances of the grouping. I have, at some inconvenience, owing to the laws of nomenclature, retained the names under which each species or variety has been described, omitting synonymy, on account of the great difficulty of verifying it. The descriptions are in many cases obviously those of individuals, and, as suggested before, a different description could be drawn up of almost every individual which would present as many points of difference as the so-called species do; so that the question of synonymy reduces itself to that of individual opinion as to the limits of a species. It is admitted by writers on *Rubus* that no hard-and-fast line can be drawn between the species, and this seems to be emphasized in *Rosa*, in which it is even more difficult to associate a series of similar forms.

I must repeat the warning that no one must expect the analytical keys, nor even the subgroup characters, to work well in so complicated a genus. I have given them because in a good many cases they will lead direct to a diagnosis; but, on the other hand, they may be wholly misleading, even in the most fundamental characters, and not until we have studied the group for some years, with Continental assistance, can we hope to master the subsection.

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ERRATUM.—P. 82, line 1, for "East *Devon*" read "East *Cornwall*."